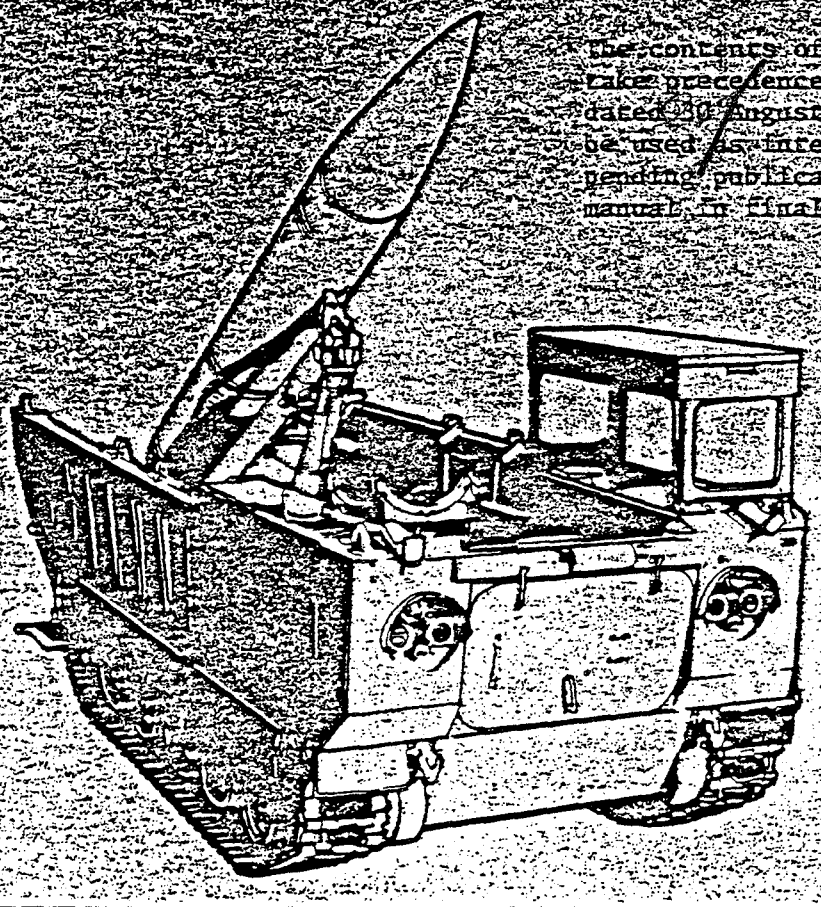
FINAL DRAFT

FM 6-42

FIELD ARTILLERY BATTALION, LANCE

The contents of this publication take precedence over FM 6-42, dated 30 August 1978, and will be used as interim doctrine pending publication of this manual in final FM format.



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OCTOBER 1984

FIELD ARTILLERY
BATTALION, LANCE
*Table of Contents

CHAPTER 1. Introduction - Role of LANCE

2. System Description

3. Organization, Responsibilities of Key Personnel

Section I. Organization
Section II. Responsibilities of Key Personnel

4. LANCE Employment

Section I. Employment Considerations
Section II. Battalion Level Employment
Section III. Battery Level Employment

5. Reconnaissance, Selection, and Occupation of Position
Section I. General
Section II. Battalion Level
Section III. Battery Level

6. Position Defense

Section I. Introduction
Section II. Operations Security
Section III. Defense of the Battery Area

7. Fire Direction

Section I. Tactical Fire Direction
Section II. Technical Fire Direction

8. Determination of Location

Section I. Battalion Survey
Section II. Battery Survey
Section III. Establishing a Firing Point

9. Communication

Section I. Communications System
Section II. TACFIRE Operations
Section III. Battalion Communications (Non-TACFIRE)
Section IV. Battery Communications (Non-TACFIRE)

10. Combat Service Support

Section I. General
Section II. Operations
Section III. Maintenance

11. Operations in Special Environments

12. Air Assault Operations

APPENDIX A Training for a Field Environment

APPENDIX B Essential Elements of Friendly Information (EEFI)

APPENDIX C International Standardization Agreements

APPENDIX D References

*The words "he," "him," "his," and "men," when used in this publication, represent both the masculine and feminine genders, unless otherwise specifically stated.

Chapter 1
INTRODUCTION

1-1. PURPOSE

This manual has been prepared to serve as a reference document for Lance battalion operations and training. It is a how-to-train and how-to-fight manual to be used by all levels of command from battalion to the platoon. It is designed to be used in conjunction with equipment technical manuals, ARTEPs, Soldiers Manuals and Trainers Guides. It sets forth doctrine pertaining to the missions, organization, tactics, techniques, and procedures used by the Lance battalion in combat and establishes guidelines for training the battalion in peacetime to meet its combat requirements; timely and accurate fire support to the combined arms team.

1-2. SCOPE

A principal theme of this manual is that Lance is a corps weapon by which the commander can influence the battle with nonnuclear and nuclear fires. Accordingly, chapter 4 emphasizes a range of considerations involved in the employment of the weapon system at all levels of command. Detailed explanation has been provided in the areas of positioning, command and control, response postures, weapons mix, survey, communications and fire direction. Chapter 7 details fire direction with the Lance fire direction system (FDS). Position and azimuth determining system (PADS) now provides each launcher position horizontal, vertical and directional control. Chapter 8 discusses survey operations at both battalion and battery level. Chapter 9 discusses communication interface with the Tactical Fire Direction System (TACFIRE) and operations with digital communication. This manual is in line with recent changes in field artillery doctrine. Extensive reference is made to FM 6-20, Fire Support in Combined Arms Operations.

Classified information necessary for the use of this manual is listed in FM 6-42-1. This supplement is published as a classified document under a separate cover. An asterisk (*) after a statement indicates that further information can be found in FM 6-42-1. Additional references pertaining to Lance are listed in appendix A.

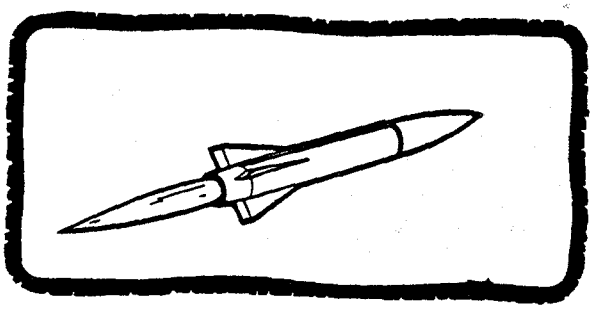
1-3. CHANGES AND CORRECTIONS

Users of this publication are encouraged to recommend changes and submit comments for its improvement. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Provide rationale for each comment to insure understanding and complete evaluation. Comments should be prepared by using DA Form 2028 (Recommended Change to Publications) and forwarded direct to the Commandant, United States Army Field Artillry School, ATTN: ATSF-WGL, Fort Sill, Oklahoma 73503.

ROLE OF LANCE

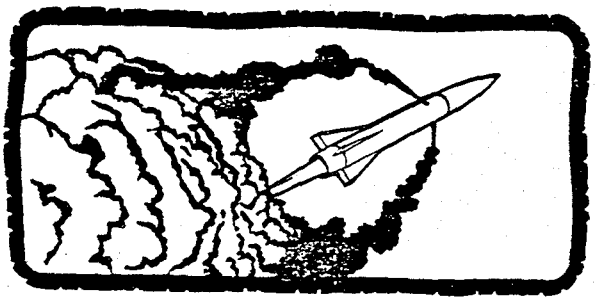
WHAT IS LANCE?

Lance is the corps commander's primary long-range artillery. It is used to influence the battle in a timely and decisive fashion.



WHAT DOES LANCE DO?

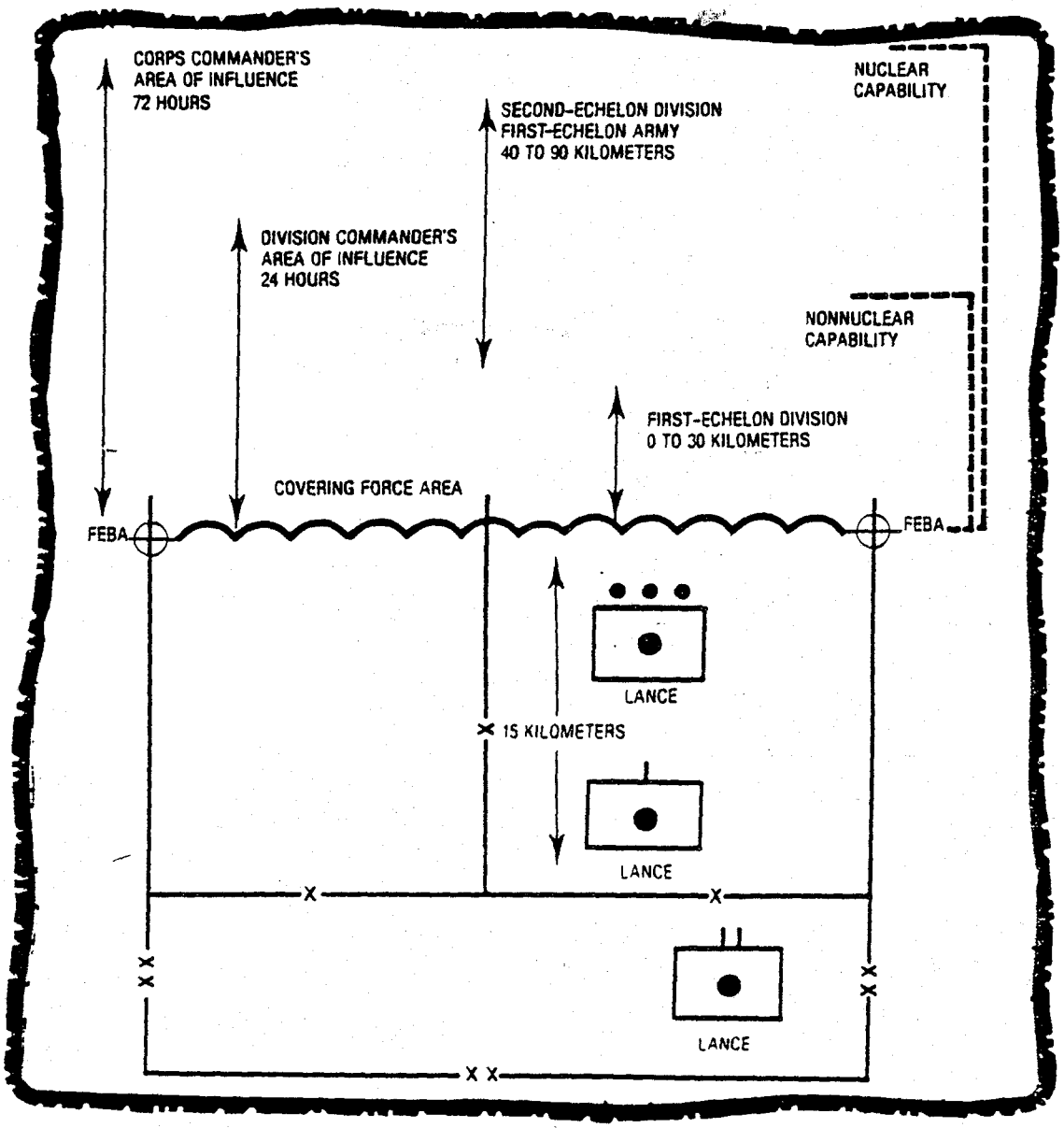
Lance provides massive and accurate nuclear/nonnuclear fire support to the combined arms team. It provides deep-strike capability to support the modern extended battlefield.



WHERE DOES LANCE FIGHT?

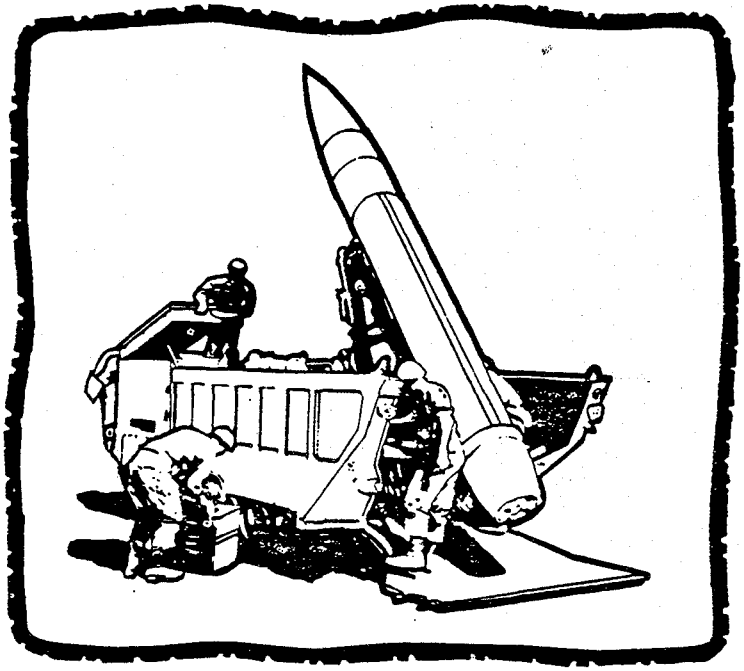
Lance is normally positioned in the brigade area, however, Lance has the mobility to fight anywhere on the battlefield. Elements of the Lance battalion will be positioned well forward in order to strike

follow-on forces. Due to Lance range limitations and doctrinal distances where follow-on forces can be expected (40 to 90 km from the forward edge of the battle area, FEBA) Lance units may be positioned within 15 kilometers of the FEBA; some Lance platoons may need to be positioned within 5 kilometers of the FEBA to strike deep targets.



WHEN DOES LANCE FIGHT?

Lance fights any time, day or night, in any weather in either a conventional or nuclear environment. It will be used against high-priority targets, such as command posts, logistical elements, troop concentrations, transportation elements, missile units, forward airfields, and fixed air defense sites. It is a significant contributor to the corps nuclear weapons "package."



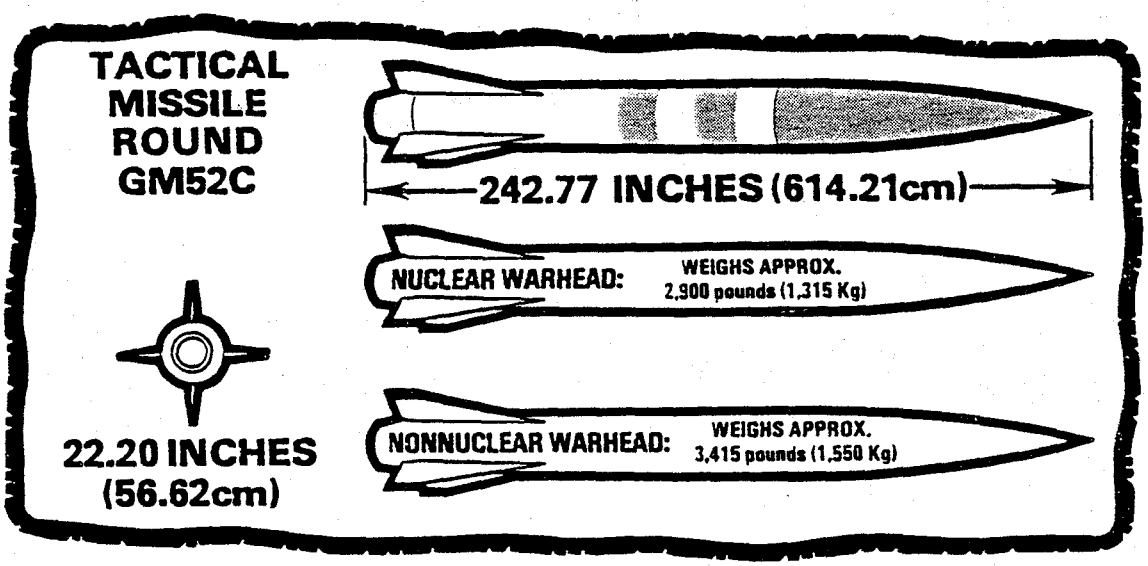
HOW DOES LANCE FIGHT?

Lance adds depth to combat with its ability to engage targets beyond the range of cannon artillery. The high mobility of a Lance launcher allows it to fire from practically anywhere on the battlefield. Low track pad pressure and an amphibious capability facilitate cross-country movement with the self-propelled launcher (SPL) and loader transporter (LT). When time or terrain restrictions hamper displacement, the launcher design allows conversion to a lightweight configuration that can be transported by cargo helicopter. The survivability of the system is enhanced by its low detection profile and its ability to hide, with proper positioning and employment. Barns, tree lines, and lightweight screening systems can conceal the presence of the firing platoon. Movement from one firing position to another is accomplished over the most concealed routes. Minimum time is spent on the firing point. Upon firing of the missile, the firing platoon rapidly displaces to avoid counterfire. The platoon may then either occupy another firing point or hide position or return to the battery area.

CHAPTER 2
SYSTEM DESCRIPTION

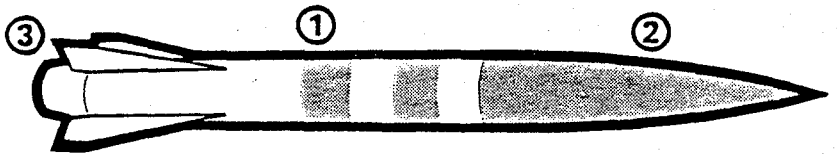
The Lance missile system provides the force commander with an effective, all-weather, day/night, nuclear/conventional weapon system to engage priority targets within the corps area of influence.* The system has excellent range capabilities. At sea level, the range of the system in the nonnuclear configuration is between 8 and 91 km and in the nuclear mode, between 8 and 115 km. If the firing point or launcher altitude is greater than 1,000 meters, the maximum range is extended to 133 km for the nuclear mode.

2-1. MISSILE DESCRIPTION



LANCE MISSILE

THE MISSILE IS COMPOSED OF THREE MAIN SUBSECTIONS: THE MISSILE MAIN ASSEMBLAGE, THE WARHEAD SECTION, AND FOUR CONTROL SURFACES.

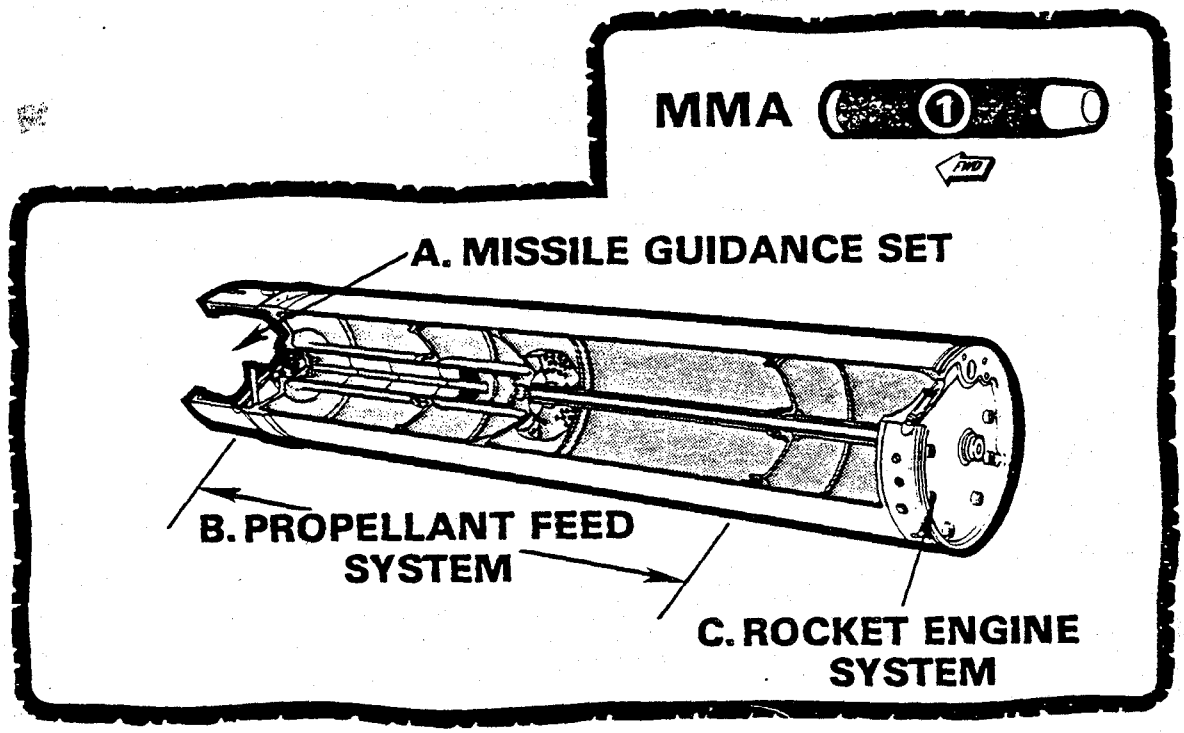


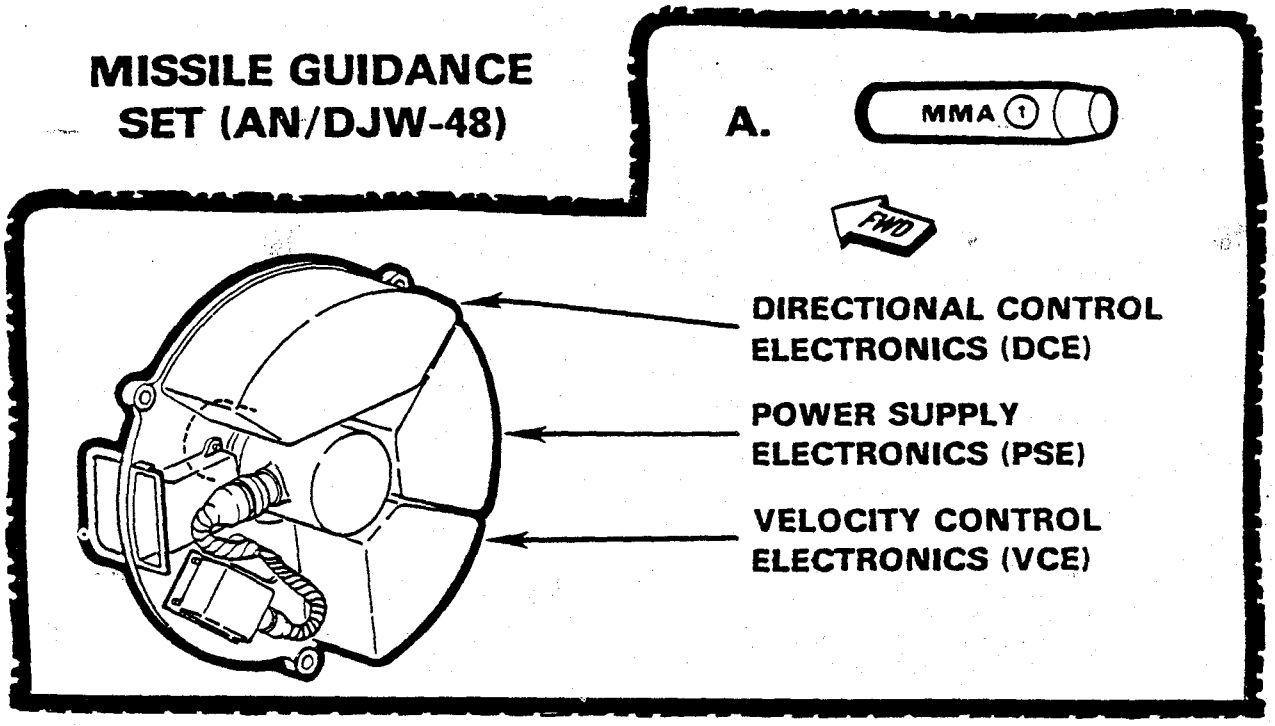
1. MMA

2. WARHEAD SECTION

3. CONTROL SURFACES

a. Guided Missile Main Assemblage (MMA) M-5. The MMA is composed of three major subassemblies:



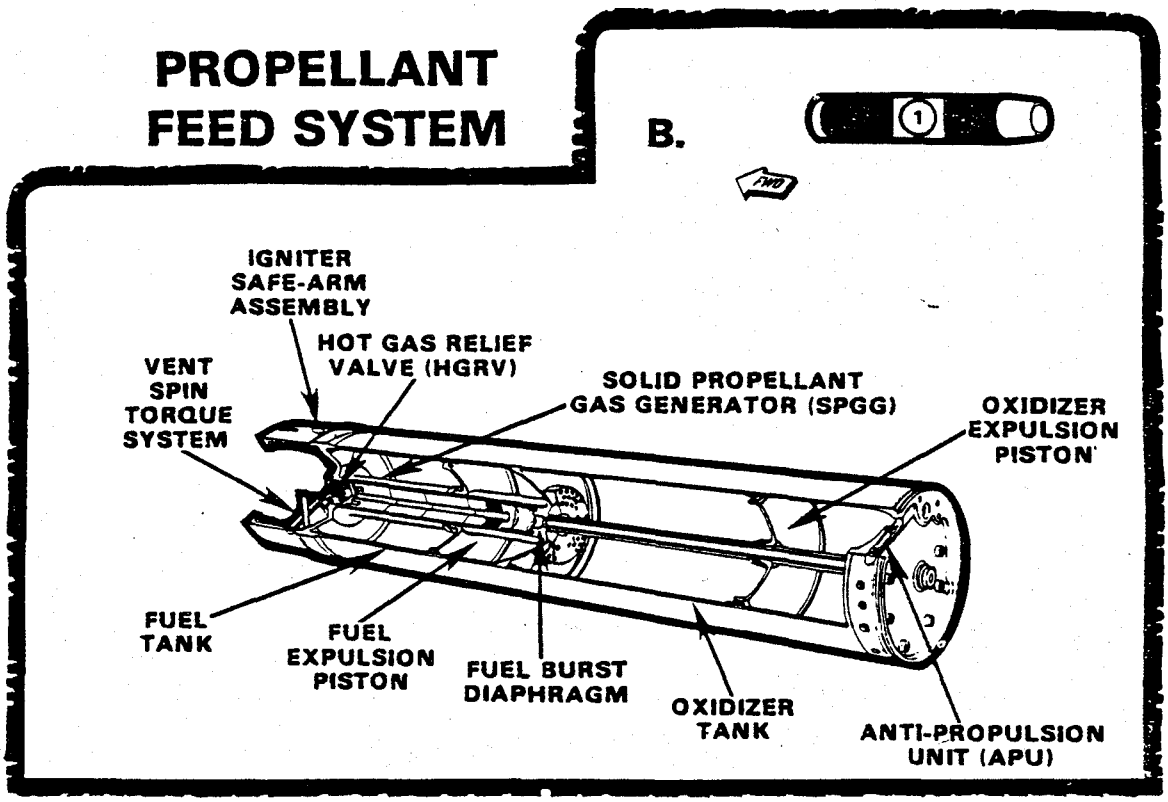


b. Missile guidance set, AN/DJW-48. The Lance missile is kept on its intended trajectory, during boost, by the directional control, automatic meteorological compensation guidance system (DC-AUTOMET). The DC-AUTOMET consists of three major subsystems: directional control electronics (DCE), velocity control electronics (VCE)*, and power supply electronics (PSE). All electronic modules are hermetically sealed and are mounted to a circular aluminum support located just behind the warhead/missile interface. The entire guidance set weighs only 36 pounds. Its modular construction allows for replacement of defective subassemblies or the entire guidance set.

During the boost phase of flight, a gyroscope senses attitude (pitch and yaw) errors caused by external forces such as wind, air density, and humidity. The resulting output signals are converted by the DCE to commands that open and close the appropriate thrust vector control valves. The resultant alteration of the main thrust vector causes side thrust to cancel the effects of the external forces and thus keep the missile on the intended trajectory. Directional control ceases at boost termination.

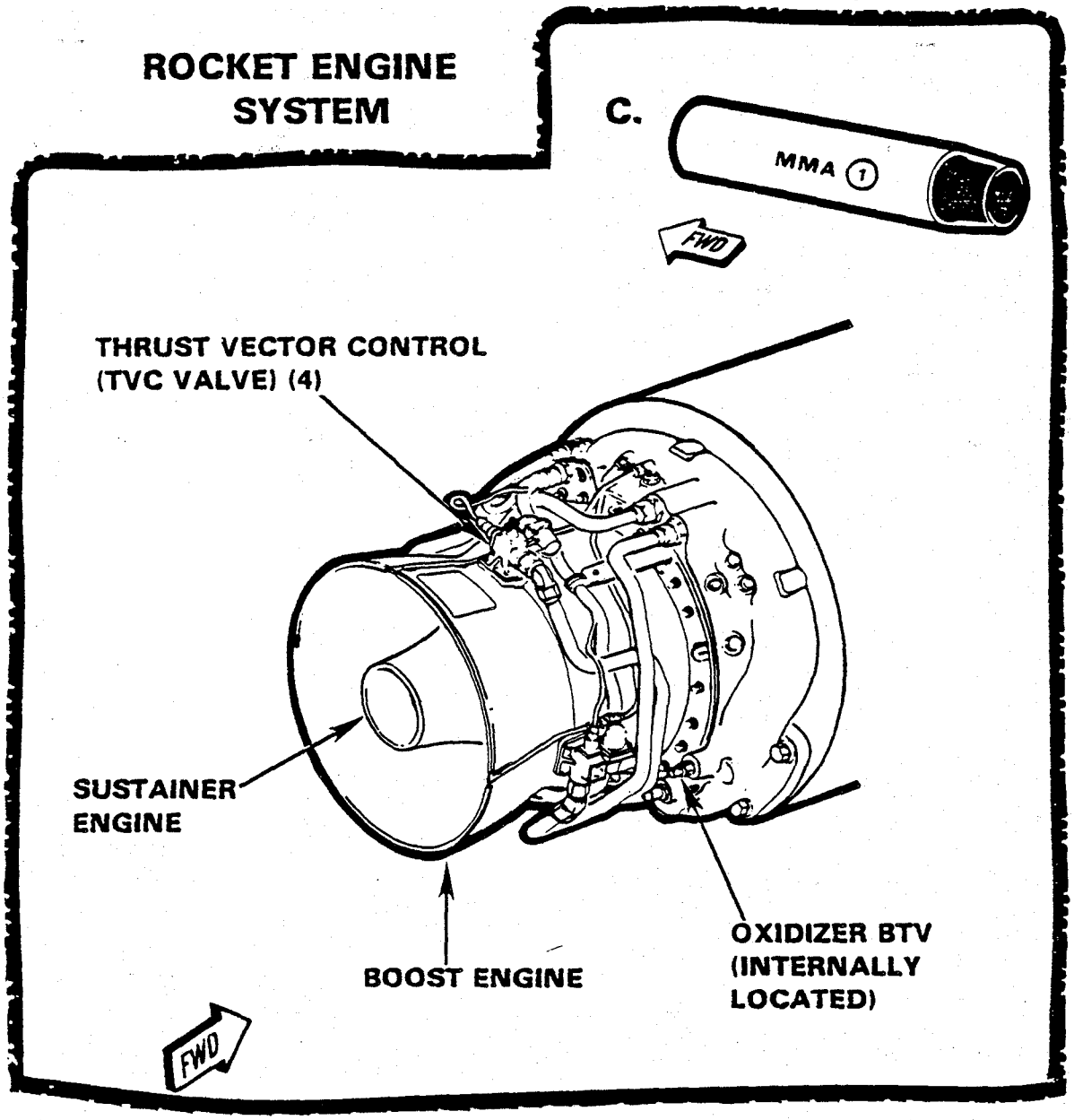
Boost termination is affected by the VCE. An accelerometer measures the missile's acceleration. Once the velocity necessary to achieve the desired range is obtained, a signal is sent to the rocket engine causing the booster termination valves to operate (booster engine

cut off-BECO). Throughout the sustain portion of flight, the accelerometer maintains the desired velocity (or a thrust equals drag condition) by regulating the amount of fuel and oxidizer flowing to the variable thrust sustainer engine. This is one of the main advantages of liquid propellants. At a preset time, a signal from the warhead routed through the VCE initiates sustainer engine cut off (SECO) shutting down the sustainer engine to prevent random fuel burnout, thus terminating the powered portion of flight.



c. The propellant feed system. The propellant feed system includes the subsystems and components necessary to store and deliver fuel and oxidizer to the rocket engine system and the necessary safety devices to ensure safe missile handling and to preclude inadvertent launch. The propellant feed system consists basically of two cylindrical aluminum tanks welded in tandem with a common internal bulkhead. The forward tank contains approximately 375 pounds (166 kg) of fuel (unsymmetrical dimethylhydrazine, UDMH), and the rear tank contains approximately 1,107 pounds (502 kg) of oxidizer (inhibited red fuming nitric acid, IRFNA). During storage, the propellants are isolated in their respective tanks by aluminum static seals and high pressure burst diaphragms. At missile round launch, the propellants are

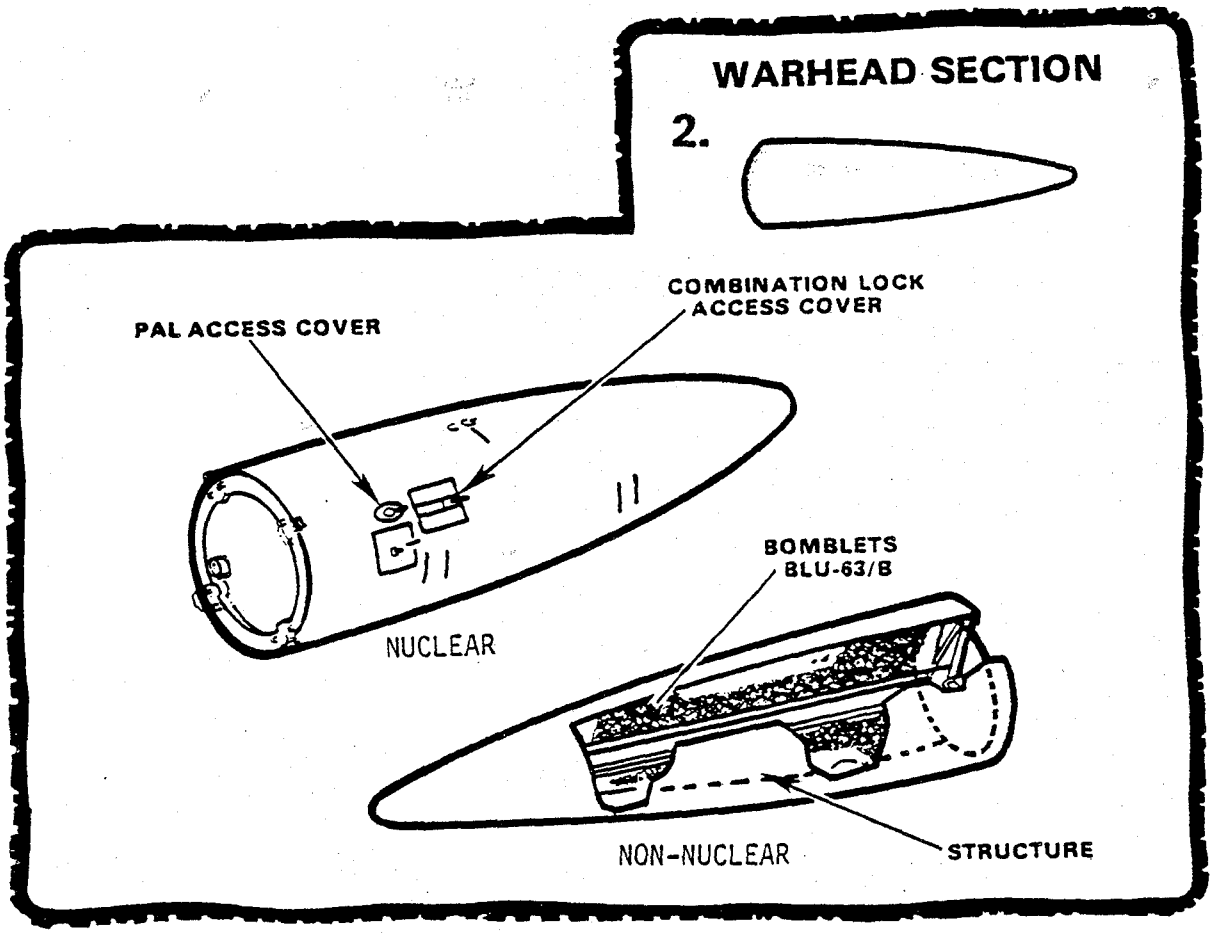
forced through the diaphragms and into the rocket engine system by the action of two pressure driven pistons, one in each tank. Pressure to drive the pistons is provided by a solid propellant gas generator (SPGG), which is regulated by the hot gas relief valves (HGRV). High pressure gas is further expelled through a vent spin torque system to impart a stabilizing spin on the missile. Two safety devices are built into the propellant feed system to prevent unintentional arming of the missile. The SAFE-ARM igniter assembly is a mechanical blocking device that prevents ignition of the solid propellant in the SPGG by displacing the firing squibs and an intermediate charge. When in the SAFE position, a spark is prevented from reaching the SPGG. The antipropulsion unit (APU) is a steel bar assembly located behind the burst diaphragm between the oxidizer tank and the rocket engine. The support provided by the bar prevents the diaphragm from bursting and oxidizer from reaching the rocket engine.



d. Rocket engine system. The Lance rocket engine is essentially two engines combined in one: A sustainer engine surrounded by a concentric booster engine. During the initial boost phase of flight, both engines provide a maximum thrust of 49,500 pounds. Raw fuel dumped into the flame plume by the thrust vector control valves causes the plume to divert resulting in the desired attitude corrections. Upon signal from the guidance set, the boost termination valves operate, cutting off fuel and oxidizer to the booster engine. Throughout the sustain portion of flight, the throttleable sustainer engine is capable of variable thrusts

between 100 and 4,650 pounds to keep the missile traveling at the desired constant velocity.

e. Warhead Section. The Lance missile employs five different warheads; two tactical, one practice, and two trainers. The warheads are 97 inches (246 cm) long, 22 inches (56 cm) in diameter.



The M234 nuclear warhead weighs approximately 465 pounds (210 kg) and is of aluminum construction. Because of its relatively light weight, it is subject to greater atmospheric friction than the non-nuclear round. It is therefore covered with an ablative skin that burns off in layers preventing the warhead from overheating. The warhead is locked with a permissive action link (PAL) that precludes unauthorized arming of the warhead. Additionally, it has a nonviolent command disable system (CDS) that will render it inoperable when the correct code is entered. The warhead is RF (radiofrequency) shielded making it invulnerable to electronic countermeasures.

The M251 nonnuclear warhead section houses the M811 fuze and carries a payload of approximately 830 BLU-63/B bomblets. The M251A1 warhead section also houses the M811 fuze and 580 M74 grenades. Each bomblet and grenade weighs approximately 1 pound and is filled with a composition B explosive filler. Upon detonation, each breaks up into a large number of high-velocity steel fragments that are effective against targets such as truck tires, missile rounds, and radar antennas. The M74 grenade also contains incendiary material.

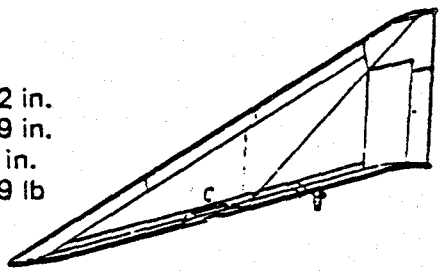
The service practice round (M252) is ballistically identical to the M234 warhed and is used for annual service practice firings.

The two training warheads (M240 and M201) are also ballistically identical and have the same controls as their tactical counterparts, but are used only for practical and maintenance training.

f. Control Surfaces. The four control surfaces provide aerodynamic stability to the missile by maintaining axial spin during flight. This is accomplished by a 3-degree cant on the trailing edge. Two sizes of control surfaces are used, depending on the warhead. The M29 large control surfaces are used with the M234 nuclear warhead. These control surfaces, like the nuclear warhead, are also covered with ablative material. The M30 small control surfaces are used with the M251 nonnuclear warhead. The control surfaces are issued with the warhead at the Special Ammunition Supply Point (SASP) or Ammunition Supply Point (ASP) depending on warhead type.

CONTROL SURFACES (LARGE M29 AND SMALL M30)

- Large M29
  - Length: 62 in.
  - Height: 19 in.
  - Width: 4 in.
  - Weight: 19 lb

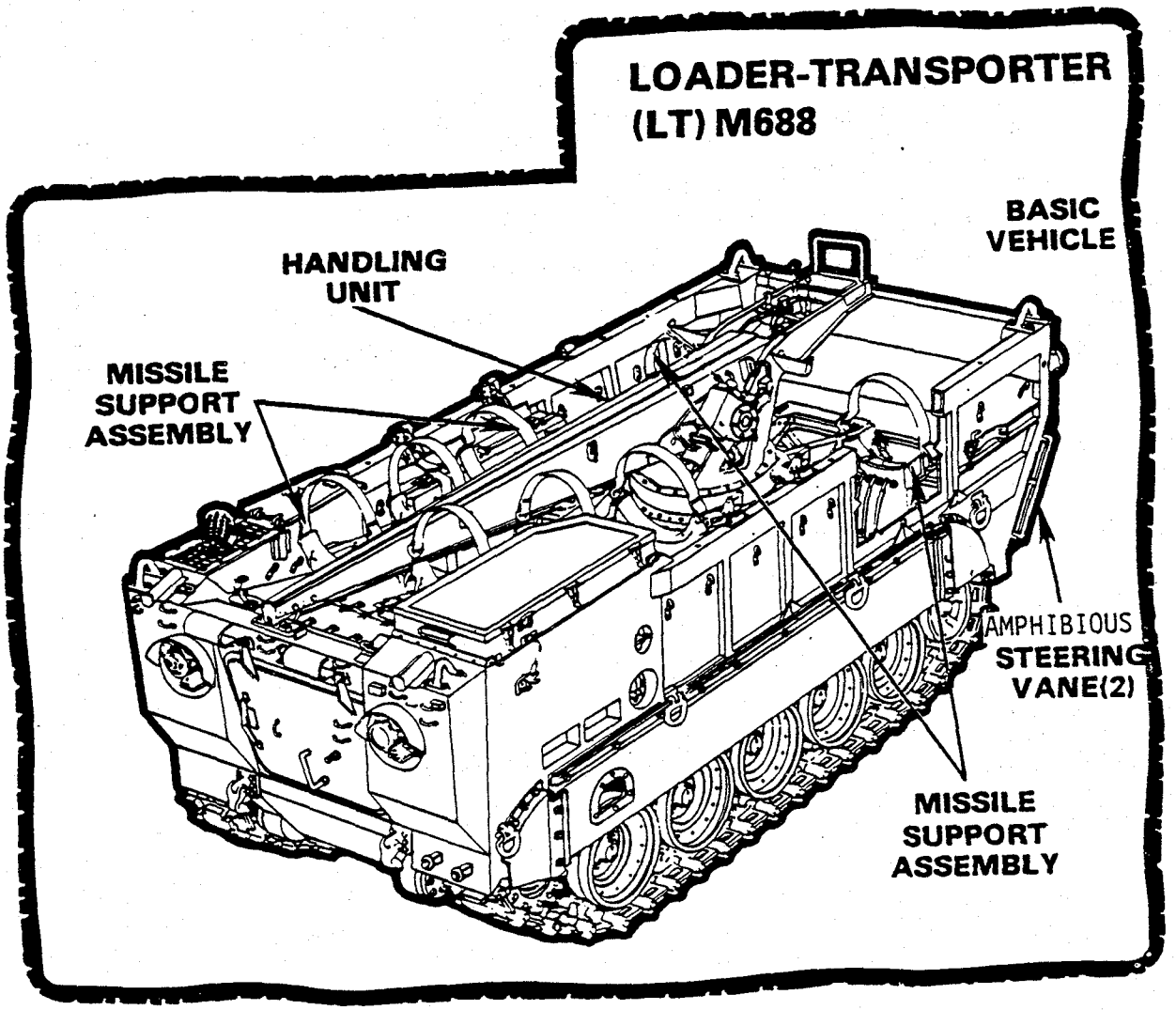


- Small M30
  - Length: 49 in.
  - Height: 15 in.
  - Width: 3 in.
  - Weight: 16 lb.

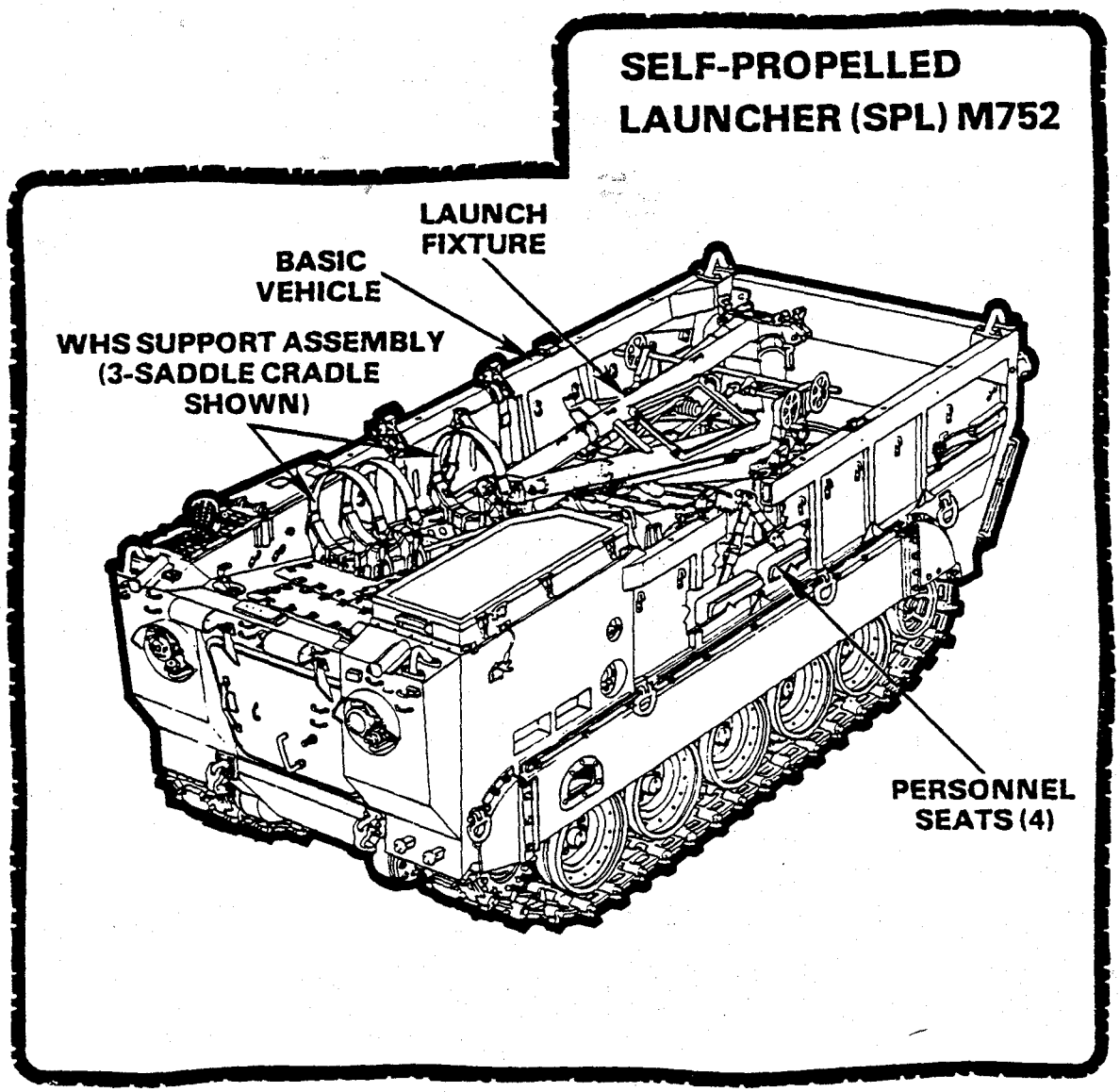
2-2. GROUND SUPPORT EQUIPMENT

a. General. The major items of ground support equipment are the loader-transporter (LT), the self-propelled launcher (SPL), and the launcher zero length (LZL). The LT and SPL are amphibious tracked carriers of which the basic vehicle is the guided missile carrier M667.

The vehicle is powered by a liquid-cooled, V6-53 diesel engine and has the same basic power train as the M113 personnel carrier with a Lance-peculiar hull. Other items of ground support equipment are the monitor-programmer, firing device, and the guided missile main assemblage shipping and storage container. The lightweight and heavy warheads come in two separately designed guided missile warhead shipping and storage containers. The mobility kit, azimuth laying set, and sling beam assembly are also items of ground support equipment. The characteristics and capabilities of ground support equipment are discussed in the following paragraphs.



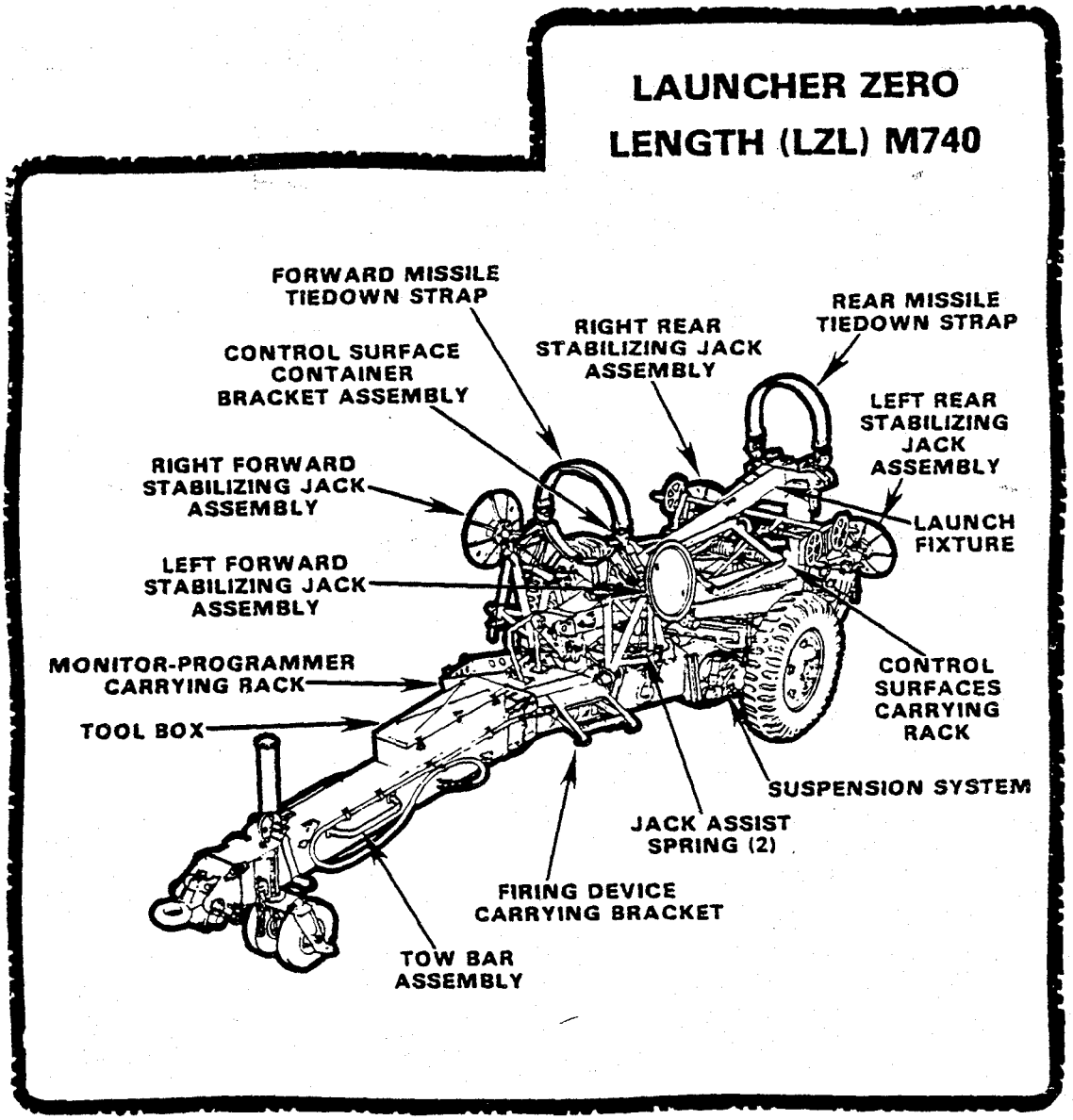
b. Loader-Transporter (LT) M688. Mounted on the basic vehicle (M667) are a handling unit, supports and cradles for two complete missiles or two main assemblage sections less warhead, and storage for auxiliary equipment. The handling unit, M39, is a constant pressure, hydraulically operated boom crane with the base secured to the support brackets in the rear of the LT. The boom has a 4,200-pound lift capacity and is controlled by three manually operated control valves that permit the operator to control boom elevation and depression, 360° traversing, and cable reel-in and -out operations. The missile support assemblies are structural castings attached to the vehicle to provide safe storage and transportation facilities for two complete missiles or missile assemblages. The auxiliary equipment stowed on the LT consists of a missile handling sling beam assembly, handtools, and basic issue items from the basic issue items list (BIIL). The LT has storage brackets for transporting two complete sets of control surfaces. The LT's primary function is to mate, load, and transport mated missiles or main assemblages. The LT is equipped with a suspension lockout system to provide a stable loading and mating platform.



c. Self-Propelled Launcher (SPL) M752. The Lance self-propelled launcher consists of the missile launch fixture and basic M667 carrier. The basic launch fixture functions as part of the SPL, serving as a missile launcher on a highly mobile base. The basic launch fixture is securely attached to the SPL but can be removed quickly and easily. By attaching the mobility kit components to the launch fixture, it is converted into a lightweight, highly mobile, towed launcher. The SPL has storage brackets for the basic issue items and miscellaneous crew equipment. Seating space is provided for four crewmembers in the cargo area and for two in the tandem cab to accommodate a total crew of six.

The SPL also carries a set of control surfaces for the missile it transports.

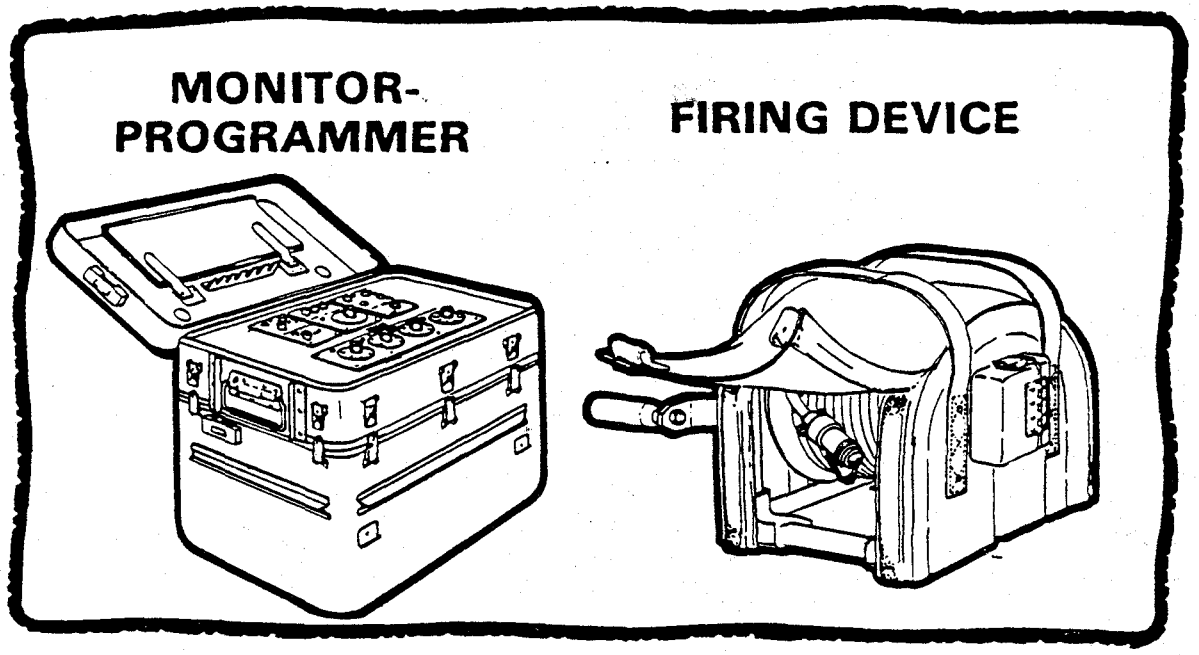
d. Launcher Zero Length (LZL) M740. The M740 is a lightweight configuration of the basic launcher that is intended for use in special operations such as air assault missions. The LZL is composed of the basic launch fixture from the SPL coupled with components of the mobility kit; a towbar, suspension arms, wheel assemblies, and four stabilizing jacks with pads. Auxiliary equipment carried on the LZL are the monitor-programmer, firing device, aiming equipment, and the control surfaces. The LZL, complete with missile, can be towed by any standard Army vehicle, 2½ ton or larger, or transported internally or externally by cargo-type helicopters. It can also be maneuvered manually over short distances or towed over short distances by ¼-ton or larger vehicle.



e. Special Support Equipment.

(1) Monitor-Programmer (MP), missile guidance set, AN/GJM-24. The MP is a self-contained electronic unit, which is stowed on a bracket mounted on the launch fixture. The functions of the MP are to perform prefire checkout, insert range information into the missile guidance system, and to control the missile firing sequence. Until the missile is fired from the launcher (umbilical disconnect), the MP will interrupt

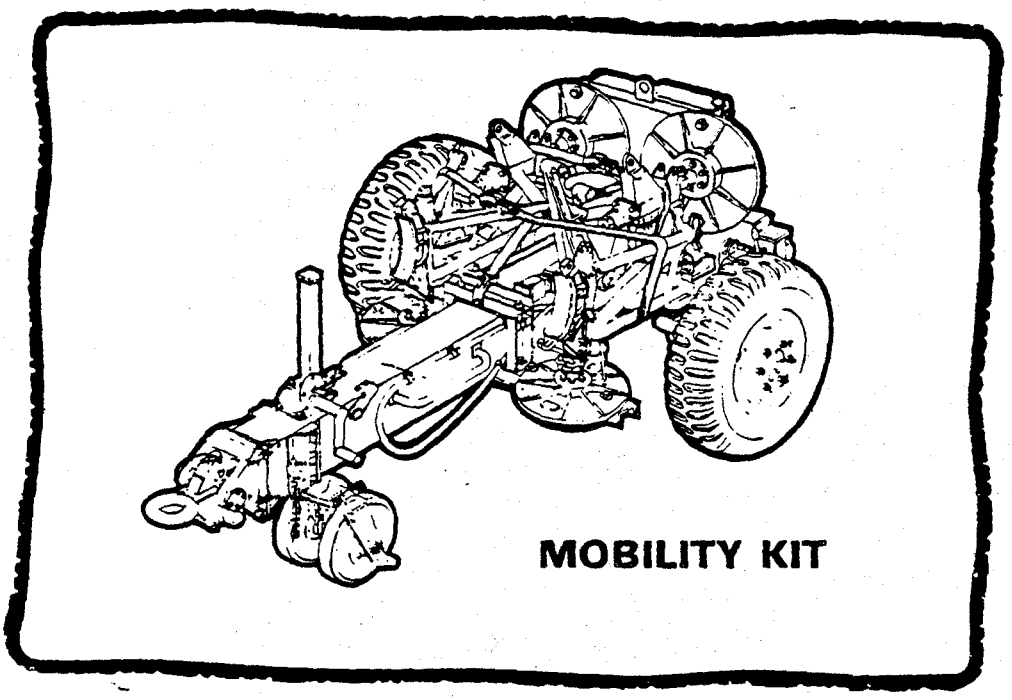
the system checkout or firing sequence if critical MP or guidance system circuitry is not functioning properly.



(2) Missile firing device M91. A portable firing device is used to arm and fire the missile from a safe position 100 meters from the launcher. It consists of a firing cable, a handle assembly, a cable reel, web carrying straps, and a firing box. During prefire testing, the firing device circuitry is checked by the monitor-programmer.

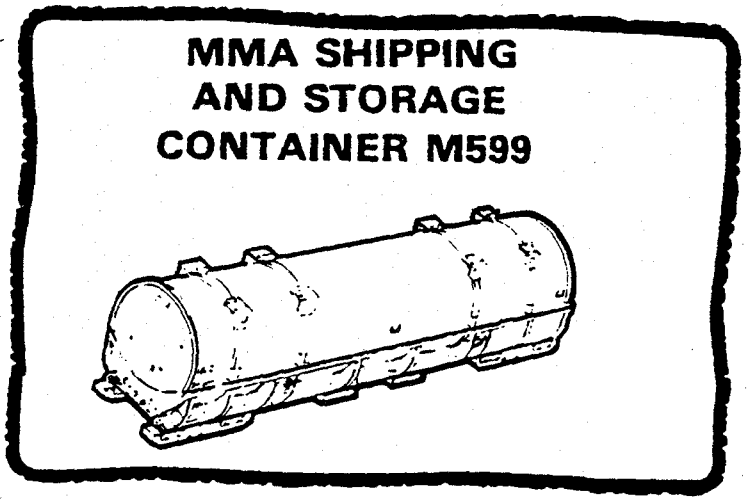
(3) Nickel-cadmium (NICAD) battery. The primary power source for the Lance ground support equipment and the ground power source for the Lance missile is a 24-volt, nickel-cadmium battery. The battery is housed in its own separate container on the launch fixture.

(4) Sighting and laying equipment. The sighting and laying equipment is used to lay and orient the missile on the desired azimuth of fire and proper firing elevation as determined by the fire direction center. Standard artillery reciprocal laying techniques are used to lay the missile. Equipment in the set includes a gunner's sight unit (GSU) consisting of a collimeter mounted on a support bracket, check tools, and a forward mirror bracket that is inserted into the missile guidance set for optical alinement.



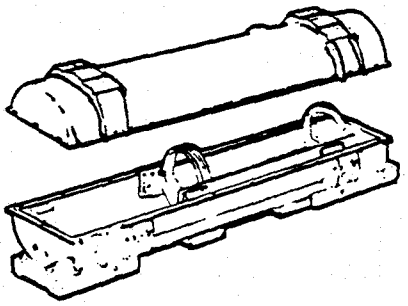
(5) Mobility kit M234. The mobility kit provides a convenient towed configuration for those items required to convert the launch fixture to the LZL. The mobility kit is issued on a basis of one per firing battery.

(6) Main assemblage shipping and storage container M599. This container secures and protects the missile main assemblage from inclement weather and rough handling during shipment and storage. The shipping and storage container is of steel construction and has skids for towing short distances. The container can be lifted by hoist or forklift and is stackable.



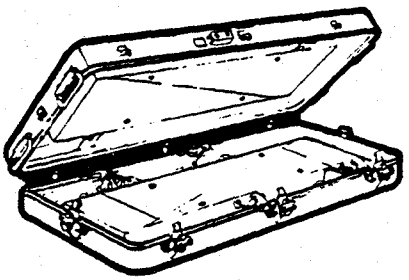
(7) Warhead shipping and storage containers M544 and M511. Both containers are of steel construction, skid mounted, and are stackable. The M511 nuclear warhead container is environmentally sealed, RF shielded, and pressure and humidity controlled. It provides quick access to the warhead CDS and cabling to monitor or lock/unlock the warhead PAL device without opening the container. Warheads and containers are not interchangeable; e.g., an M234 nuclear warhead cannot be placed in an M544 nonnuclear container and vice versa.

WARHEAD SHIPPING AND STORAGE CONTAINER



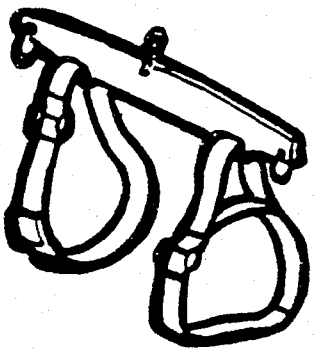
(8) Control surface shipping and storage containers M596 and M597. These containers are carrying cases used to protect the missile control surfaces from damage before they are installed on the missile.

CONTROL SURFACE SHIPPING AND STORAGE CONTAINERS



(9) Sling beam assembly M22. The sling beam is a multipurpose handling device used with the loader-transporter. The sling beam serves as a spreader bar with shackles at either end to attach long and short cables to be used in the lifting of the main assemblage container, warhead section container, or the launch fixture. By removing the cables and attaching heavy nylon straps around the spools on the lower edge of the beam, the sling becomes a handling device for a complete missile, main assemblage, or warhead section. The sling is carried on the LT during movement.

SLING BEAM



(10) The Fire Direction System (FDS) provides tactical and technical control at battalion and battery level. The FDS consists of the Battery Computer Unit (BCU), Power Distribution Unit (PDU), in-line printer, radios and communications security (COMSEC) equipment. System software is impregnated on a magnetic tape located inside a Tape Transport Unit (TTU) that is inserted into the Program Load Unit (PLU) in the BCU. The FDS allows a battery or battalion Fire Direction Center to transmit or receive digital communication and interface with the TACFIRE system.

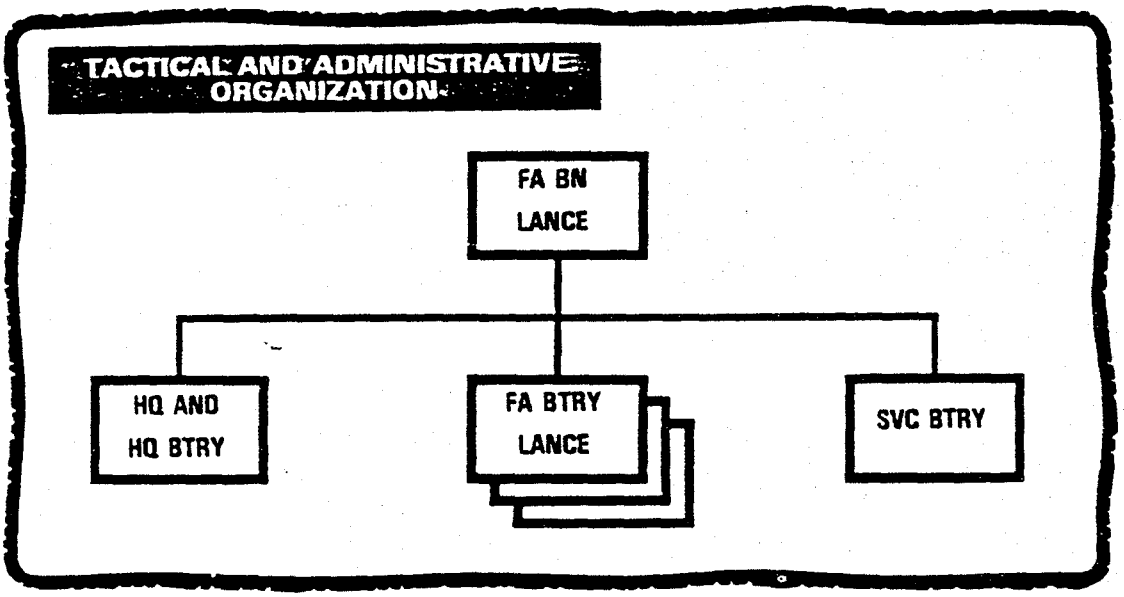
2-3. ADDITIONAL DESCRIPTIONS OF EQUIPMENT

Complete descriptions and illustrations of equipment peculiar to the Lance missile system are included in TM 9-1425-485-10-1 and -2, TM 9-1410-485-12, TM 9-1425-485-12, TM 9-1430-489-12, TM 9-1450-486-12, TM 11-7440-283-12-1 and -2, and the appropriate warhead manuals.

CHAPTER 3
ORGANIZATION, RESPONSIBILITIES OF KEY PERSONNEL
Section I. ORGANIZATION

3-1. FIELD ARTILLERY BATTALION, LANCE

The Lance battalion is organized as a tactical and administrative unit composed of a headquarters and headquarters battery, a service battery, and three identical firing batteries.



3-2. HEADQUARTERS AND HEADQUARTERS BATTERY (HHB)

The mission of the headquarters battery is to assist the battalion commander and his staff in the performance of their duties by providing the personnel, equipment, and facilites to operate the headquarters and to provide administrative, logistical, maintenance, and communication support to the elements of command. The Lance headquarters and headquarters battery is organized into seven major elements: the battalion headquarters, battery headquarters, headquarters support section, operations section, fire direction section, communications platoon, medical section, and air defense section.

a. The battalion headquarters consists of the battalion commander and the necessary staff to command and control battalion functions and activities.

b. The battery headquarters is commanded by the battery commander. The 1SG is his principal enlisted assistant and assists the commander in areas such as discipline, morale, supply, security, maintenance, and administration.

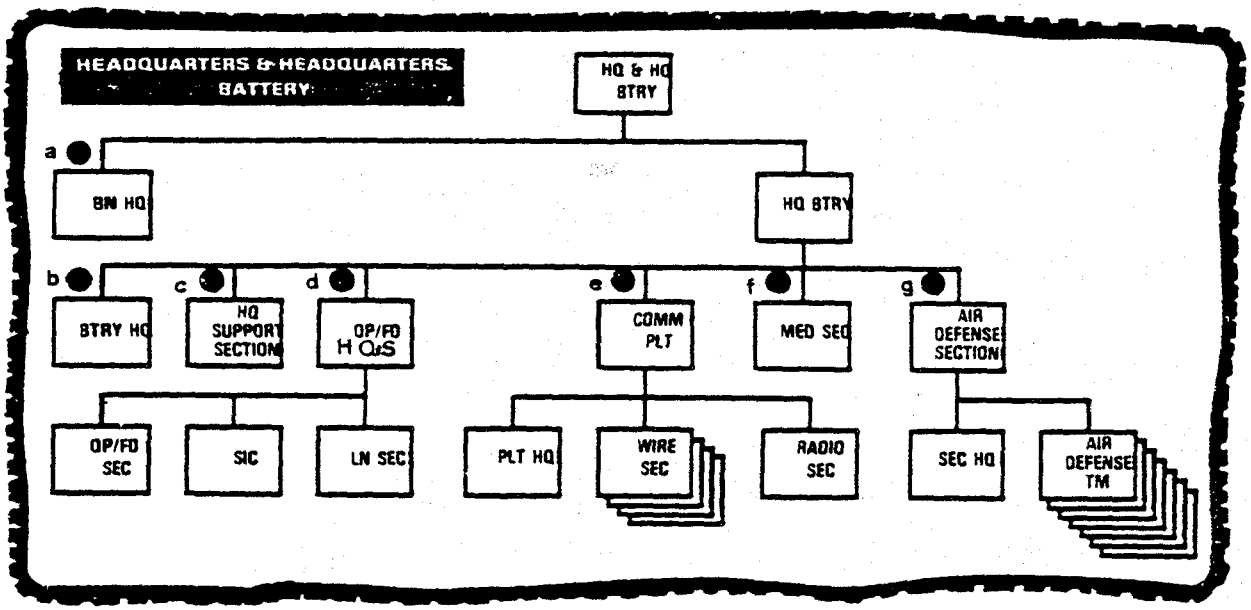
c. The headquarters support section is supervised by the battalion S1. The section is responsible for administrative correspondence, legal support, management of combined administration at battalion level (CABL), and general health and welfare of the troops.

d. The operations section and fire direction section are supervised by the S3. Responsibilities include tactical and technical fire direction, intelligence operations (supervised by the S2), plans, and training. Also, the battalion SIC and liaison section are under the control of the S3. The S3 coordinates battalion survey activities with the reconnaissance/survey officer and coordinates survey requirements with higher and adjacent headquarters.

e. The communications platoon consists of a platoon headquarters, a radio section, and four wire sections. The platoon installs, operates, and maintains the battalion communications system under supervision of the communications-electronics staff officer (CESO). The platoon headquarters also acts as the battalion message center.

f. The medical section establishes the battalion aid station under supervision of the enlisted medical supervisor. The section provides sick-call, dispensary-type medical service, emergency medical treatment for patients who require further evacuation, and definitive treatment to those who can be treated within the battalion and returned to duty.

g. The air defense section consists of a section headquarters and seven air defense teams. The section provides the battalion with an organic air defense capability, access to the forward area alert radar (FAAR) for early warning of approaching aircraft, and expertise/advice on the employment and capabilities of the unit's air defense weapons.



3-3. SERVICE BATTERY

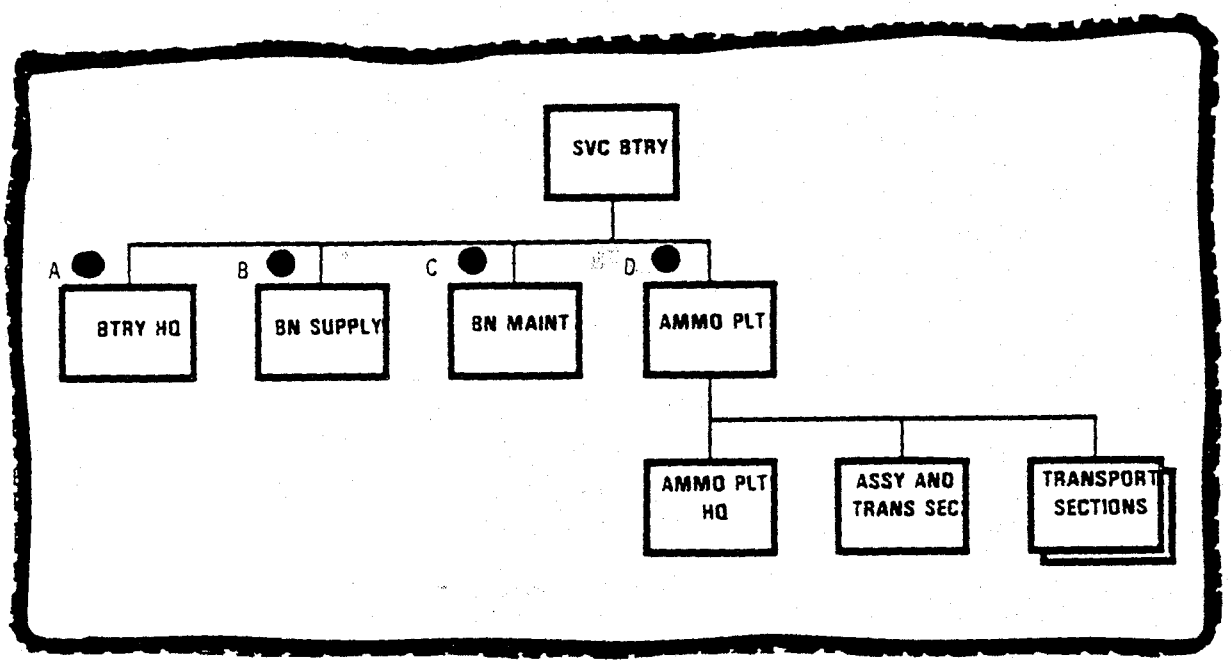
The mission of the service battery is to procure and distribute all classes of supplies to the units of the battalion, maintain supply records, provide ammunition service and perform organizational maintenance not within the capabilities of the batteries. The battery is divided into four sections to carry out this mission.

a. The service battery headquarters performs command, administrative, mess, supply, communications, and maintenance functions for the battery.

b. The battalion supply section performs supply functions for the battalion. It maintains battalion property records, consolidates requisitions and turn-ins, procures and issues supplies, and assists the batteries in all matters concerning supply.

c. The battalion maintenance section performs all organizational maintenance functions that are not within the capability of, or authorized to be performed by, the batteries. Turn-in of items for periodic calibration are also functions of the maintenance section.

d. The battalion ammunition platoon has one assembly and transportation section and two transport sections and is organized to perform both conventional and special ammunition resupply to the firing batteries.



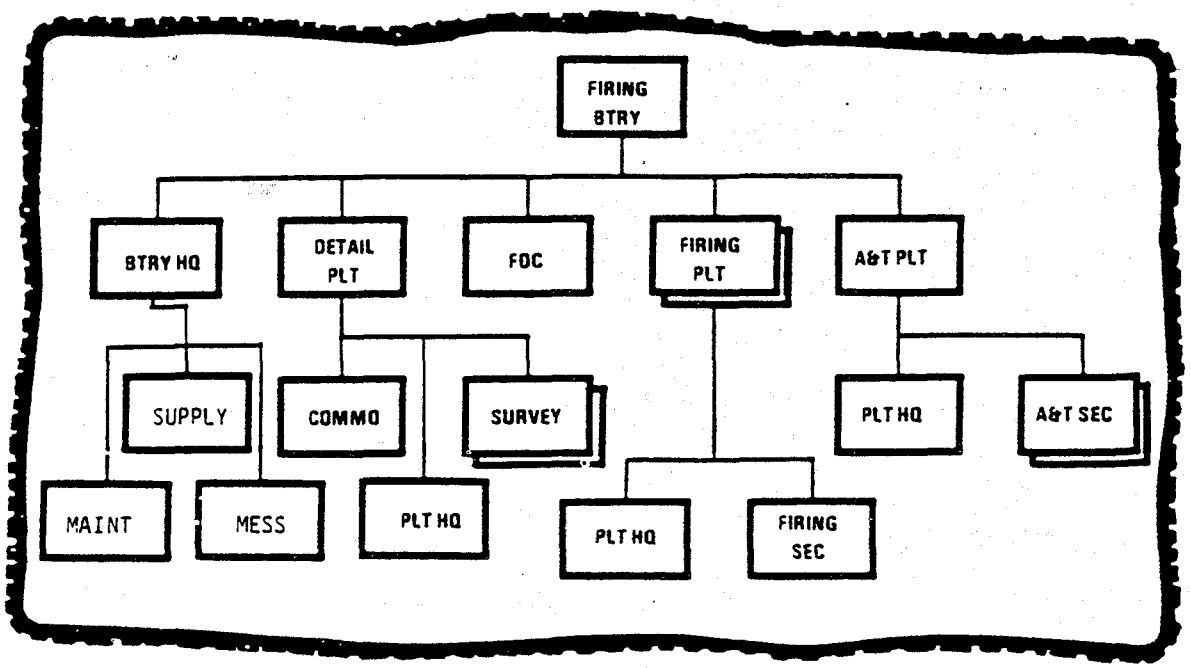
3-4. FIRING BATTERY

The mission of the Lance firing battery is to provide the firing component of the Lance battalion. The battery is composed of the battery headquarters, detail platoon, fire direction center, two firing platoons, and the assembly and transport platoon. Each firing platoon consists of a platoon headquarters and one firing section with one launcher. The functions performed by the Lance battery are the same as those for other artillery organizations, with the following modifications:

a. The firing batteries depend on the support elements of the battalion for administrative support. The batteries are responsible for internal communications, survey, and battery maintenance. The firing battery is capable of performing as a firing unit if it is provided with the elements contained in the call for fire (FM 6-40-4).

b. The assembly and transport platoon (A&T) of each firing battery is responsible for receiving, loading, transporting, and storing Lance missiles; and for assembling those missiles. This platoon is composed of a platoon headquarters and two assembly and transport sections.

c. Individuals of this organization can engage in defense of a unit's position. However, simultaneous defense of the position and performance of the unit mission cannot be accomplished. Augmentation by additional security personnel is required.*



Section II. RESPONSIBILITIES OF KEY PERSONNEL

The responsibilities of key personnel closely parallel those in other artillery organizations. The following paragraphs list major duties of key personnel of the Lance battalion and are not intended to be all inclusive. Army force structure may prohibit unit MTOEs from looking exactly like base TOE.

3-5. BATTALION COMMANDER

The battalion commander is responsible for everything his command does or fails to do. Assisted by his staff, he controls all the tactical, logistical, and administrative activities of the battalion. He makes provisions for uninterrupted perpetuation of the chain of command in his organization by prescribing the succession of command for all contingencies. He is responsible for the accomplishment of his command's assigned mission.

a. Tactical responsibilities. The commander establishes policies and plans and supervises the tactical employment of his battalion to include:

- Reconnaissance, selection, and occupation of position (RSOP).

- Fire direction, detailed coordination, and integration of available fire support with the plan of operation of the supported unit.

- Maintenance of liaison with the supported or reinforced commander by direct contact or by representation.

- Maintenance of current information concerning the enemy situation and the situation of the supported force.

- Security of nuclear weapons.

- Communications and electronic security.

- Readiness of his battalion to operate in an NBC environment.

b. Training. The battalion commander is responsible for the training of his unit. He directs the training program for the battalion and, assisted by his staff, coordinates the training of his unit with the next higher headquarters.

c. Discipline. The battalion commander, closely supervises the mental, moral, and physical training of his men.

d. Morale. The battalion commander prescribes a fair and uniform policy governing promotions, leaves, decorations and awards, and duty assignments, and insures the efficient operation of the personnel support system. With the assistance of the battalion medical personnel, he controls sanitation, personal hygiene, and health.

e. Administration. The battalion commander organizes and employs his staff to insure efficient administration of his battalion.

f. Supply and maintenance. The battalion commander normally delegates his supply authority to the S4. He may request technical inspections and technical assistance from supporting combat service support organizations.

3-6. BATTALION STAFF

The semi-independent operations, level of deployment, complex technical equipment, and the importance of the mission of the Lance battalion combine to require a high degree of professional military and technical skill.

The battalion commander's staff is composed of the executive officer, S1, S2, S3, S4, assistant S3, communication/electronics staff officer (CESO), chemical officer, ADA platoon leader, liaison officer, surgeon, chaplain, reconnaissance and survey officer, missile maintenance technician, motor officer, motor maintenance technician, and command sergeant major.

3-7. BATTERY COMMANDER

The battery commander is responsible for insuring that the battery accomplishes its mission. Specific tactical responsibilities include:

- Performing reconnaissance and selection of battery positions (chapter 5).

- Supervising battery occupation (chapter 5).

- Planning specific actions which will enhance the battery's survivability (chapter 6).

- Planning unit marches and movements (chapter 5).

- Supervising the security, preparation, and delivery of nuclear weapons (FM 100-50).

- Supervising and maintaining the battery's nuclear surety/ personnel reliability program (AR 50-5).

- Establishing and maintaining communications and electronics security (chapter 9).

- Logistical planning for battery supply, mess, and maintenance (chapter 10).

- Keeping the battalion commander and the personnel of his battery informed of the current situation.

3-8. BATTERY OFFICERS

The platoon leaders throughout the battalion perform all the command functions normally required at the platoon level, to include important tactical, technical, and supply functions. It is imperative that officers assigned these responsibilities be technically qualified in all of the tasks of their sections and be able to perform their duties with minimum supervision. Additional duties unique to Lance operations are discussed below.

a. The executive officer commands the battery in the absence of the battery commander. He plans, coordinates and supervises battery defensive operations. He also assists the battery commander in executing unit marches and movements.

b. The assistant executive officer is responsible for fire mission processing and overall supervision of the fire direction center.

c. The detail platoon leader is responsible for and supervises the establishment of all internal and external communications. Additionally, he is responsible for all of the battery's survey requirements. During combat operations he normally assists the commander with survey reconnaissance.

d. The assembly and transport platoon leader is responsible for the resupply of ammunition and missiles and for missile assembly.

e. The firing platoon leader has specific responsibilities during firing, which include verification of the lay of the missile, warhead settings, monitor-programmer setting, and arming of the missile.

3-9. NONCOMMISSIONED OFFICERS

a. The first sergeant, as the battery commander's senior NCO, coordinates all activities in the battery position, advises the commander on tactical and personnel matters and assists in RSOP operations. In addition, working directly with the executive officer, he plans, coordinates, and supervises battery defensive operations.

b. The firing platoon sergeant coordinates platoon operations, assists the platoon leader in performing his duties, and is responsible for technical operations required to launch the missile.

c. The assembly and transport platoon sergeant coordinates platoon operations and assists the platoon leader in performing his duties. He is responsible for the inspection and maintenance of the equipment organic to the platoon headquarters.

d. The firing section chief is responsible for:

- Training and efficiency of the firing section personnel.

- Performance of duties in section drill outlined in TM 9-1425-485-10-2, appendix E.

- Inspection and maintenance of all section equipment.

e. The assembly and transport section chief is responsible for:

- The training and efficiency of A&T section personnel.

- Receiving, storing, transporting, and assembling missiles, converting from one launcher configuration to another (SPL to LZL), and assisting the firing section in loading or offloading the launcher.

- Inspection and maintenance of all section equipment.

- Performance of those duties prescribed in TM 9-1410-485-12, appendix G.

f. The detail platoon sergeant is usually the most senior NCO among the detail platoon section chiefs. Additional duties include reconnaissance NCO.

g. The chief fire direction computer supervises the processing of fire missions. His duties include:

- Insures the Fire Direction System is correctly set up and initialized.

- Verifies computations made by the fire direction computers.

- Maintains FDC records and reports.

- Insures situation and firing capabilities maps are correct.

- Coordinates ammunition resupply.

3-10. LANCE MAINTENANCE PERSONNEL

a. The Lance missile maintenance technician (214G - warrant officer) is the technical expert on the Lance system. His responsibilities include:

- developing an effective missile maintenance program.

- monitoring missile maintenance activities to insure compliance with technical manual requirements.

- assisting the battalions S-3 in developing an effective technical operations training program.

b. Lance missile organizational maintenance personnel (MOS-15DZ3) provide the expertise to perform unit level maintenance tasks. Personnel holding the additional skill identifier Z3 should be assigned to positions where this technical knowledge may be utilized.

CHAPTER 4
LANCE EMPLOYMENT

This chapter provides a general overview of the employment of Lance. The options available to the force commander in organizing for combat are discussed. Specific procedures for employment are explained in the following chapters.

Section I. EMPLOYMENT CONSIDERATIONS

4-1. ORGANIZING FOR COMBAT

The command and control of Lance battalions, like all field artillery battalions, is established through the two step process of organizing for combat:

Step 1: Establish a command relationship.

Step 2: Assign a tactical mission.

Based on the corps mission, one to five Lance battalions may be assigned to corps. Headquarters and Headquarters Battery, Corps Artillery and field artillery brigade headquarters will be available within the corps to provide command and control for the Lance battalions as appropriate. Depending on the supported force's mission, target acquisition capabilities of that force, and the controlling headquarters, Lance units may be organized for combat as follows:

(1) Separate battalion. When a Lance battalion is assigned to the corps (Step 1) and not further assigned to a field artillery brigade or to subordinate maneuver units, the battalion is under the control of the corps field artillery commander. To assist him in accomplishing his tasks, there is a Headquarters and Headquarters Battery, Corps Artillery. The HHB, Corps Artillery has operational control over the battalion along with the responsibility for planning and coordinating fires. Tactical missions normally assigned to a Lance unit are general support or general support reinforcing (Step 2). When assigning missions at this level, the primary consideration is whether or not it is to the corps commander's best interest to relinquish control of his primary long-range artillery.

The advantage of the separate battalion organization is that the corps commander retains immediate control of Lance, enhancing responsiveness to the corps commander's needs. The major disadvantage of the separate battalion is that HHB, Corps Artillery, although able to function as a command and control center, is unable to provide logistic support to the battalion.

The nuclear missions require responsiveness to corps direction--the separate battalion organization facilitates that responsiveness. The separate battalion concept is ideal when the Lance battalion is simply hiding, waiting for nuclear release. This situation is likely to occur

after the battalion has expended its nonnuclear ammunition. The battalion may drop outside the range of hostile cannon artillery to enhance survivability.

(2) Lance attached to a field artillery brigade. Lance battalions may be attached to field artillery brigades. By attaching Lance battalions to FA brigades, the corps field artillery commander's span of control is reduced.

The most common method of organizing Lance for combat is to attach the Lance battalion to brigades that include cannon, rocket, and missile battalions. The brigade relays fire missions, status reports, and other information between the corps FSE and the Lance battalion.

A field artillery brigade consisting primarily of cannon artillery units with Lance units attached would normally be attached to a division or given the mission of GSR/R a division artillery. Attachment to a division or reinforcing a division artillery is not a desirable tasking for Lance, since the capabilities of the battalion become focused on a relatively small zone of action. The availability of targets at division level suitable for attack by Lance is also to be considered. Nevertheless, Lance can be used in this role if it is the intention of the corps commander to weight the offense/defense in a particular division zone with missile fires.

A field artillery brigade consisting solely of attached Lance battalions should be assigned the mission of general support of the corps. With the assignment of this mission, the corps field artillery commander has decreased his span of control while retaining the responsiveness of his long-range artillery. If a battalion of this brigade is positioned in a division zone, it may be appropriate to assign a nonstandard mission to accommodate calls for fire from that division. In this event, the corps commander may desire to limit in some way the number of rounds expended at the division level to insure that sufficient are available for his own use. In any event, priority of fires would be retained by corps. The Lance brigade is particularly useful during wartime because it incorporates the advantages of responsiveness (associated with separate battalions) and logistic support (associated with the brigade).

(3) Attached to a division. Normally, a Lance unit is attached to a division only when the division is operating as an independent force. In this case, the Lance battalion operates under the command and control of the division commander. The mission of general support to the division is the only appropriate mission for Lance under these circumstances.

4-2. TACTICAL MISSIONS

Fire support responsibilities for Lance battalions are designated by the tactical mission assigned. These missions are assigned by the force commander on the recommendations of the force field artillery

commander and are published in the force's operations order and fire support annex. With few exceptions the standard field artillery tactical missions and inherent responsibilities that apply to cannon FA apply also to Lance battalions.

a. General support (GS). Due to its greater range capability and its massive destruction potential, a Lance unit is normally assigned the mission of general support. This mission allows the force commander to exercise maximum control of the system's capabilities--both nuclear and nonnuclear. It also insures that the force commander will have a weapon system immediately available to him to add depth to the battlefield and/or influence the battle.

b. General support reinforcing (GSR). Lance units are also suited for the assignment of a general support reinforcing mission, specifically to augment the fires of an artillery brigade or division artillery. By assigning a Lance unit the GSR role, the force commander has relinquished some of his control over the unit in order to provide his subordinates the authority to fire Lance rounds allocated to their commands.

c. Reinforcing (R). The mission of reinforcing will rarely be assigned to a Lance unit. However, if the situation dictates that it is to the force commander's advantage to give up control of his primary long-range artillery, the Lance battalion is capable of fulfilling the inherent responsibilities associated with a reinforcing mission.

d. Direct support (DS). A direct support mission is inappropriate for Lance. Destructive power potential, larger circular errors probable (CEP), and relatively slower rates of fire preclude a Lance unit from providing the type of fire support required by committed maneuver units.

4-3. FIRE SUPPORT PLANNING AND COORDINATION

The fires of the battalion are planned, coordinated, and integrated with other fires and with maneuver elements in accordance with existing principles for the employment of fire support as set forth in FM 6-20. There are, however, some principles/concepts that require further explanation and/or emphasis.

a. Organizations Involved. When Lance is assigned the tactical mission of general support, fire planning for conventional and special munitions is accomplished by force field artillery headquarters and the force FSE. The fire support coordination will be accomplished by the force artillery FSE. As the tactical mission changes, planning and coordination will be accomplished in accordance with the inherent responsibilities of that mission.

At corps level, HHB, Corps Artillery is responsible for planning and coordinating fires for Lance battalions operating as separate battalions or as part of the field artillery brigades under corps

control using the Field Artillery Tactical Fire Control Direction System (TACFIRE) interfacing with the LANCE fire direction system (FDS). HHB, Corps Artillery has the responsibility of providing guidance and supervision for the planning and execution of fire support. Specifically, the fire support element receives and processes target acquisition information from all sources. This information is used to develop targets that are analyzed and then, based on the commander's guidance, assigned as appropriate for attack by Lance.

Normally, a field artillery brigade will do no fire planning or fire support coordination for its attached Lance battalions. For these functions, the brigade acts as a relay between HHB, Corps Arty and the battalion.

The fire planning and fire support coordination function of the Lance battalion is advisory in nature and is based on the tactical mission assigned to the battalion. In addition, the battlion is the "doer" of the process. At this level, fire plans are translated into specific assignments, such as which platoon will fire and from what firing point.

b. Planning. Since Lance battalions generally remain under the control of corps, fire planning will be accomplished at corps level. It is the responsibility of the HHB, Corps Artillery fire support element to plan the use of Lance fires--both nuclear and nonnuclear. Fires are planned on all targets of interest to the corps.

Critical also to the planning process will be the corps commander's guidance for the employment of nuclear and nonnuclear warheads of the Lance missile system. For nuclear employment of Lance, the commander's guidance should include:

- Tactical circumstances under which a request for Lance fires would be initiated.

- Yields to be expended.

- Desired effect on the enemy.

- Collateral damage preclusion criteria, troop safety criteria, and other employment constraints.

- Changes from the corps standing operating procedures (SOP).

In addition, guidance should be provided for the development of a "package" of nuclear weapons. For the employment of nonnuclear Lance, the commander's guidance is established essentially under the same criteria as used for nuclear employment except for such obvious items as yields and preclusion criteria.

Paragraph 3 of an OPORD will outline how the commander wants to use the firepower of Lance. If required, the how may be amplified by a fire support annex and appropriate appendices. For example, the planning data for nuclear fire support may be published as the nuclear support plan. Nonnuclear Lance warheads, like nuclear weapons, require an allocation and authorization for expenditure and an announcement of the ammunition load for a specific operation; this planning data may require additional explanation in the format of an appendix to the fire support annex.

c. Coordination. Fire planning is of little practical value if the coordination necessary to insure the successful execution of a plan has not been accomplished. Coordination is keyed on established principles (see FM 6-20). Some of these principles require further explanation as they relate to the Lance missile system.

(1) Consider use of all available fire support means. Each FSCOORD considers the fire support available at his and higher levels and the command guidance for its use. Ideally, the weapon best suited for the job is selected for employment on a specific target. Sometimes, however, it will be necessary to use the most available system even though it is not the most effective system. This puts fires on the target "now." In the case of Lance fires, specifically nonnuclear, the FSCOORD should not stereotype his thinking and discount the use of the missile because of CEP and reaction times. Some targets normally considered appropriate for attack by cannon artillery may, in terms of psychological effect, be successfully engaged by Lance. For example, Lance firepower could be used to attack enemy maneuver units confined to a small area because of a restrictive terrain.

(2) Airspace coordination. The trajectory of the Lance missile is such that the firing of the weapon creates a hazardous condition to friendly aircraft over the battlefield. For this reason, the FSCOORD must provide input to those agencies and personnel engaged in airspace management at corps, to include time of launch, location at launch, etc.

(3) Provide rapid coordination. Lance requires more time to engage a target than a cannon unit. Therefore, the FSCOORD must know the capabilities of Lance; he must have immediate information on the availability of Lance; he must insure that coordination channels are established and are functioning smoothly; and he must stay abreast of the battle as it develops in order to resolutely attack planned targets and targets of opportunity by Lance. Adherence to all of the preceding criteria enhances the reaction time for the missile system. Frequent use of warning orders to the Lance battalion will also insure timely use of the weapon.

d. Response Times.* Another key element in fire support planning and coordination of Lance fires is the time required to launch a missile. The time factor is dependent upon the method of employment,

status of equipment, weather conditions, status of communications, training, and morale of personnel.

The battalion commander is responsible for keeping the appropriate higher commander informed of the readiness status of the battalion. Information most critical to successful firing, planning, and coordination concerns firing battery positions, operational status of launchers, and availability of missiles and warheads.

*For a more detailed discussion of response times, see FM 6-42-1.

e. Fire Direction. HHB, Corps Artillery or the field artillery brigade will designate and transmit target information to the battalion over fire direction channels. Data furnished the battalion will include the elements contained in the call for fire specified in FM 6-40-4. For highly important targets, it may be appropriate for two sections to be assigned to one target--one section as the primary launch element with the other as backup.

The Lance battalion S3, fulfilling his responsibility to provide tactical fire direction, normally will designate the battery to fire the mission. Computations required to convert firing data into fire commands are normally computed by the designated battery to fire but may also be accomplished by the battalion FDC as a backup means.

Usually the battery FDC will designate the firing position and the firing section to engage the target if not previously designated. They will furnish the fire commands and other required data to the section in accordance with FM 6-40-4.

4-4. TARGETING

During conventional/nuclear operations, the conventional battle is fought while nuclear weapons are employed in such a way that the timing and location of the attack produce a dramatic change in the conventional battle to the advantage of US forces. The Lance missile system is an ideal weapon for the corps commander to use in this type warfare. The system is capable of providing either nuclear or nonnuclear fires. As a result, the commander has available a weapon that may be used to attack a variety of targets.

a. Nuclear Operations. Lance may be used to deliver nuclear fires during the following tactical actions:

(1) Offense.

- Attack defensive positions.
- Attack fire support systems.
- Attack command and control centers.

- Prevent reinforcement of the defense.

- Counter counterattacks.

- Protect the flanks.

- Isolate selected terrain.

- Attack supply installations.

(2) Defense.

- Attack committed frontline and breakthrough forces.

- Seal penetrations.

- Attack reserves.

- Attack second echelon lead elements.

- Attack fire support systems.

- Deny enemy access to critical terrain or avenues of approach.

- Attack command and control centers and prestocked supply points.

(3) Nuclear weapons package. A nuclear weapons package contains the total number of nuclear weapons required to support any one of several anticipated tactical contingencies. Lance can be used in the role of attacking the deeper targets of the package or to stand off at a greater distance from the FEBA and attack the nearer targets of the package. Whatever the case, the rate of fire and the variety of yields available for Lance make it a weapon quite suitable for the nuclear package concept.

(4) Target analysis concepts for Lance. The targeting process for Lance involves various functions each of which is a responsibility of some agency within the several levels of command. As a result, the time required to place fires on a target may be long in some cases. Therefore, the target analyst must make every attempt to use the most efficient means of analyzing a target for nuclear Lance engagement. He must consider two concepts when processing a fire mission for Lance. Both of these procedures should be addressed in the corps SOP and the desired method amplified.

When time and circumstances permit, the analyst at the FSE may use the distance between the target and the Lance battery as a range to target. Using this method, a no greater than (NGT) range will be calculated by the Lance Fire Direction System (FDS). The NGT range will serve notice to the battalion that only those firing points at a range

to the target less than the NGT range will be used to fire the mission. In this manner, the Lance battalion has complete flexibility and control in designating which of its subordinate units will fire the mission while insuring no degradation of desired effects on the target.

When precision target analysis procedures are required, it may be necessary for the analyst to use an actual firing point location. This will cause the FSE to designate the firing point to be used.

b. Nonnuclear Lance.

(1) Attack criteria. Targets appropriate for attack by nonnuclear Lance are those that are relatively stationary and "soft"; i.e., primarily personnel and/or light materiel.

(2) Targets for nonnuclear Lance.

- Cannon and missile batteries.
- Command and control elements.
- Logistical elements.
- Air defense sites.
- Forward airfields.
- Chokepoints.

4-5. WEAPONS MIX

The term "weapons mix" as it pertains to Lance is the ratio of nuclear to nonnuclear warheads that will be transported by the Lance battalion as part of its basic load. In addition, weapons mix describes that number of weapons that will be available in the ammunition supply channel to replace missile ammunition expended by the battalion in prolonged combat.

Ammunition directly influences tactical operations. Therefore, tactical commanders must plan their operations and commit their forces with full awareness of the support capabilities of the ammunition service support structure. Likewise, combat service support commanders must establish, stock, and employ ammunition service units with full awareness of the operational plans of the supported tactical commanders. Weapons mix is a function of tactics and combat service support.

a. To determine the appropriate weapons mix in the battalion and in the supply channel to the battalion, the following must be considered.

(1) Availability of Lance warheads and missile main assemblages.

(2) Mission of the corps. On completion of his mission analysis, the corps commander provides his staff with his initial planning guidance. A critical element of the planning guidance is the commander's concept on the use of nuclear as well as nonnuclear Lance warheads during the forthcoming tactical operations.

(3) Operational requirements. Weapons mix is also determined by the type of combat action anticipated. For example, in a defensive posture, we might plan to fire a nuclear package thereby requiring a greater proportion of nuclear weapons to be positioned with the Lance battalion.

(4) Availability of launchers. The commander and his staff must also consider the number of Lance launchers available for use in any future operations. As an adjunct to this concept, the sustained rate of fire must also be considered. (Refer to FM 6-42-1.)

(5) Command decision. The supply of missiles is a logistical action; however, expenditure is a matter of tactical command decision. The commander must decide whether to commit his supply of missiles or to hold it for future commitment based on his estimate of the situation.

(6) Unique class of supply. Missiles and missile warheads have many characteristics that distinguish them as a unique class of supply. For example, extensive security measures must be exercised to safeguard nuclear warheads.

(7) Priority of supply. Considering the destruction potential of the Lance missile system and the capability it provides the commander to influence the battle, priority within the supply system for the Lance battalion is a must.

b. Response Postures.

(1) Response Posture I: Maximum Nonnuclear Response. All launchers and loader-transporters within the firing batteries are loaded with missiles armed with nonnuclear warheads.

(2) Response Posture II: Increased Nuclear Response. All launchers are loaded with missiles armed with nonnuclear warheads. Each loader-transporter in the firing batteries is loaded with one nuclear round and one nonnuclear round.

(3) Response Posture III: Immediate Nuclear Response. Half the launchers are loaded with nuclear rounds, and half are loaded with nonnuclear rounds. Each loader-transporter in the firing batteries is loaded with one nuclear round and one nonnuclear round.

(4) Response Posture IV: Maximum Nuclear Posture. This position is essentially a reversal of phase I. All loader-transporters and self-propelled launchers are loaded with nuclear rounds.

The above mentioned phases reflect, but are not necessarily limited to, actions at the firing platoon level. If the corps commander deems it appropriate, different response postures could be assigned to individual batteries within a battalion or the various Lance battalions within the corps/brigade. For example: One battery within a battalion may be in a maximum nuclear posture and well hidden, while the other two batteries may be in any of the other response postures.

4-6. LIAISON

In addition to meeting the inherent responsibilities established through the assignment of tactical missions, Lance has a requirement to provide liaison regardless of the assigned mission.

The primary responsibility of the liaison section is to provide timely tactical information to the battalion and to represent the battalion commander at the FSE concerning all Lance matters of employment to include posture, capabilities, and limitations. The liaison officer must have an excellent understanding of Lance fire support planning and coordination techniques, system responsiveness (FM 6-42-1), nuclear operations and the unit SOP. A standing operation procedure must be developed in conjunction with the battalion S3, where a free flow of information is passed between the elements. The liaison officer (LNO) must have a current situation report of the battalion at all times. He must know unit locations, the status of launchers, and ammunition. On the other hand, the LNO must pass tactical information to the battalion on the current situation, target location, and the type of warheads to be used. He must be alert for any change in the situation that may cause the battalion to go to an increased nuclear or nonnuclear posture. Also during nuclear operations, the LNO must provide timely information of aiming point refinement to the battalion. As the Lance fire support coordinator, the LNO must insure that his digital and voice communication link with the battalion is properly maintained. In addition to a good understanding of proper communication techniques and procedures, the liaison section must have good operational radio equipment. By providing timely information between the battalion and the FSE, the liaison section is a vital link in the processing of Lance fire support.

Section II. BATTALION LEVEL EMPLOYMENT

THE MISSION OF THE LANCE BATTALION IS TO DESTROY, NEUTRALIZE, OR SUPRESS THE ENEMY BY MISSILE FIRE.

After the organization for combat has been determined, the Lance battalion commander employs his battalion to effectively support the force commander's battle plan. The factors of METT-T (Mission, Enemy, Terrain and weather, Troops available-Time) play an important role in the battalion commander's planning activities. Several areas which concern the Lance battalion commander, regardless of the mission

assigned, are communications, logistical support, terrain availability, and survivability.

To effectively provide the fires required by the force commander, the communication links between the Lance battalion, it's controlling headquarters, and it's subordinate elements must be reliable and efficient. Since a Lance battalion normally operates across extended frontages, positioning of the battalion's subordinate elements is critical in ensuring reliable communications. Because the battalion will be required to communicate over long distances to diverse units, the use of wire, messenger, sound and visual signals will be severely limited. The use of messengers will normally be limited to administrative logistics messages which are not time sensitive. The battalion must place nearly total reliance on radio communications. (See Chapter 9 for a detailed discussion of communications.)

The battalion commander has several options in organizing the HHB and service battery to provide the required combat service support. HHB and service battery may occupy separate position areas, they may be collocated, or the commander may organize them into field trains and combat trains. The commander must weigh the advantages and disadvantages of these options and apply them to the current tactical situation before deciding which option to use.

The success of the Lance battalion's tactical operations is directly related to the quality and timeliness of the support provided by its combat service support elements. Therefore, the management of support functions and operations in the battalion by the S1, S4, or any other supervisor must be closely coordinated with the tactical operations. A continuous exchange of information among combat service service support (CSS) managers, the S3, and battery commanders is essential to the success of both tactical and logistical plans.

Lance units can provide only limited defense against a ground attack by enemy forces. Survivability of the Lance system is dependent primarily upon it's ability to avoid detection, unit dispersion, and rapid displacement of firing sections. Since Lance provides significant combat power for the deep attack with both nuclear and conventional fires, enemy forces can be expected to place a high priority on locating and destroying these units. A more detailed discussion of security measures can be found in chapter 6.

Section III. BATTERY LEVEL EMPLOYMENT

The effective employment of a Lance battery will determine how well the battalion as a whole will perform its mission. Many routine functions in a Lance battery closely parallel those of a cannon battery. Therefore, many procedures discussed in this section are similar to those given in FM 6-50, modified for Lance applicability.

This section describes the functions of the various organizations within the battery and how they contribute to the overall operation of the battery.

4-7. BATTERY OPERATIONS

Battery operations can be broken down into six functional areas that cover daily routine operations on a sustained basis. These functional areas are concerned with the operations of the battery headquarters, the fire direction center (Chapter 7), the assembly and transport platoon, the firing platoons, the survey parties (Chapter 8), and the communications section (Chapter 9).

4-8. BATTERY HEADQUARTERS

The battery headquarters or CP is controlled by the battery commander and first sergeant. The CP coordinates and requests all of the administrative and logistical requirements of the firing battery.

a. Administration. Through periodic personnel status reports outlined in unit SOPs, the first sergeant should report all SIDPERS transactions and personnel actions to battalion S1. Additionally, all class VI requests should be submitted to the S1 for consolidation.

b. Supply. Class II, class III, class IV, and V requests are formulated and submitted to the battalion S4. The supply section also maintains unit issue and hand receipt records.

c. Maintenance. The battery maintenance section will compile all classes VII and IX requests for submission and maintain all battery automotive equipment and repair parts.

d. Mess. The battery mess section will submit class I requests, pick up and prepare rations, and maintain a potable water supply for battery personnel.

e. Medics. Medics provided to the battery by battalion will perform emergency first aid procedures when required; and request and maintain those class VIII supplies that are authorized.

f. NBC. The battery NBC NCO and/or NBC officer will issue and maintain protective masks, decontamination supplies and equipment, and radiological and toxic detection and monitoring equipment. They will be responsible for organizing and training detection and monitoring teams and decontamination squads.

4-9. ASSEMBLY AND TRANSPORT OPERATIONS

The A&T platoon will maintain a mixture of nuclear and nonnuclear weapons based on the unit's response posture. Nuclear weapons must be properly safeguarded in a field storage location (FSL). Upon receipt of proper authentication and/or release, weapons will be mated and/or

unlocked and delivered to the appropriate firing platoons. Loader-transporters may be required to accompany a firing platoon to the vicinity of a firing point to transload rounds after firing. A&T personnel should be prepared to set up security and concealment in the hide/rendezvous area. The A&T platoon will perform necessary inspections to insure reliability of missile rounds prior to their transfer to the firing platoons. Time permitting, each round should be loaded on a launcher and a mated missile checkout performed by the firing platoon. Empty warhead, MMA, and control surface containers will be returned to service battery when being resupplied with new rounds. The most expedient method of doing this is to have the empty containers loaded on the 5-ton XLWB trucks and simply exchange vehicles with the resupply convoy. Strict vehicle operator maintenance must be maintained with this method to preclude neglect of the vehicle. A&T operations in the battery area should be carried out under good natural overhead concealment or camouflage nets. LTs and 5-ton trucks will be camouflaged while in position and travel with canvas covers or bows installed and tied down to prevent observation of the missile rounds that would immediately identify the unit.

4-10. FIRING OPERATIONS

The firing platoon leader will verify release and receive fire missions prior to departing the battery area for a firing point when possible. The firing point should not be occupied until the last possible moment to preclude enemy detection. Where time allows, the launcher and crew should remain concealed in a hide position in the immediate vicinity of the firing point while the point is being prepared and instruments set up by selected personnel. Even though the firing platoon conducts a mated missile checkout as soon as a missile is loaded on the launcher, if time allows, another checkout may be performed in the hide area to insure system reliability. Additionally, security should be established around the point using crew served weapons.

The firing platoon leader is responsible for firing point reconnaissance, selection and occupation. Considerations parallel those the battery commander must consider when selecting battery positions (Chapter 5).

If after occupying the point, the position comes under attack, every effort should be made to fire the round, particularly if the mission is part of a schedule of fires. The position should only be abandoned to preclude the loss of the launcher or section personnel.

In the event of a hangfire/misfire or a NO GO, battery FDC should be notified immediately. On a schedule of fires it may be more expedient to load another round on the launcher after waiting the required amount of time (TM 9-1425-485-10-2) and firing, than it would be to alert another firing platoon that would require computing another set of data, loading a round (if not already loaded), traveling to another firing point, and performing the mission.

If, during a nuclear fire mission, communications are lost between any two links of the fire control chain, the round will not be fired. Because of the nuclear weapons package concept, absolute control must be maintained up to the last possible moment, since a sudden change in the tactical or political situation may dictate a "check fire." Once the missile has been laid, the firing platoon leader must check with the FDC to insure that the mission is still a "GO" before firing. If communications have been lost, he must not fire until they can be reestablished and an authenticated "GO" is received.

If communications are lost during a nonnuclear fire mission, a decision on whether to fire should be based on whether or not the mission was part of a schedule of fires (TOT) or an ASAP/target of opportunity mission. If a TOT mission, and communications have been made since occupying the point, the platoon leader should consider firing the round at the scheduled time. If, however, the mission is not time critical, an attempt should be made to reestablish communications.

Air Assault fire missions will generally be conducted as a two-part operation. An advanced party will prepare the firing point and establish security while the crew prepares the launcher for the mission in the rear area. Once it is prepared, the firing platoon will move forward to the firing point to complete the mission. The platoon leaders should insure that the platoon is not on the ground any longer than necessary to accomplish the mission to preclude detection and engagement.

CHAPTER 5
RECONNAISSANCE, SELECTION, AND OCCUPATION OF POSITION (RSOP)

Section I. GENERAL

RECONNAISSANCE (RECON) . . . A MISSION UNDERTAKEN TO OBTAIN INFORMATION BY VISUAL OBSERVATION OR OTHER DETECTION METHODS ABOUT THE ACTIVITIES AND RESOURCES OF AN ENEMY OR POTENTIAL ENEMY OR ABOUT THE METEOROLOGIC, HYDROGRAPHIC, OR GEOGRAPHIC CHARACTERISTICS OF A GIVEN AREA.

5-1. RECONNAISSANCE

On the battlefield, a sophisticated enemy is capable of locating and engaging the Lance battalion in a number of ways. To survive, Lance units must be able to move quickly and efficiently. The key to a successful movement is timely and continuous reconnaissance, careful position area selection, and expeditious occupation of position. Based upon the tactical situation, the commander must anticipate his next move. He uses, a combination of several reconnaissance techniques.

a. Map reconnaissance. The commander and his staff must continuously analyze proposed areas and travel routes by the effective use of map reconnaissance. Considerable ground or air reconnaissance time can be saved by first insuring that tentative areas of operations have wooded areas or overhead cover for concealment of battery positions and firing points, ground slope limitations for Lance-peculiar equipment have not been exceeded, adequate survey control is available, and terrain or obstacles between positions have been considered. Aerial photographs can be used to update and provide more detail to the map reconnaissance.

b. Air reconnaissance. If the assets are available and the situation permits, an air reconnaissance can be made. The information gained from an air reconnaissance can be useful in the selection of specific route(s) to be used and areas to be occupied. Air reconnaissance is a fast method, but may not be advisable at battery level because true surface conditions may not be distinguishable or may appear distorted.

c. Ground reconnaissance. A ground reconnaissance is the best method of determining the suitability of routes to be traveled and positions to be occupied. The actual condition of the route(s) to, and the terrain pattern within, the proposed area are seen as they exist. This method, however, is more time consuming than either the map or air reconnaissance.

Each method of reconnaissance offers the commander a different but complementary perspective of the best route to the best position. If the situation permits and time is available, all three methods may be used. In most instances, the commander performs a map reconnaissance, selects a tentative route, and then conducts a ground reconnaissance.

After completion of the reconnaissance, the commander may meet with his staff and battery commanders to discuss the selection of the new position areas. He may, however, elect to send his battery commanders an order initiating movement to, or reconnaissance of, the new position area.

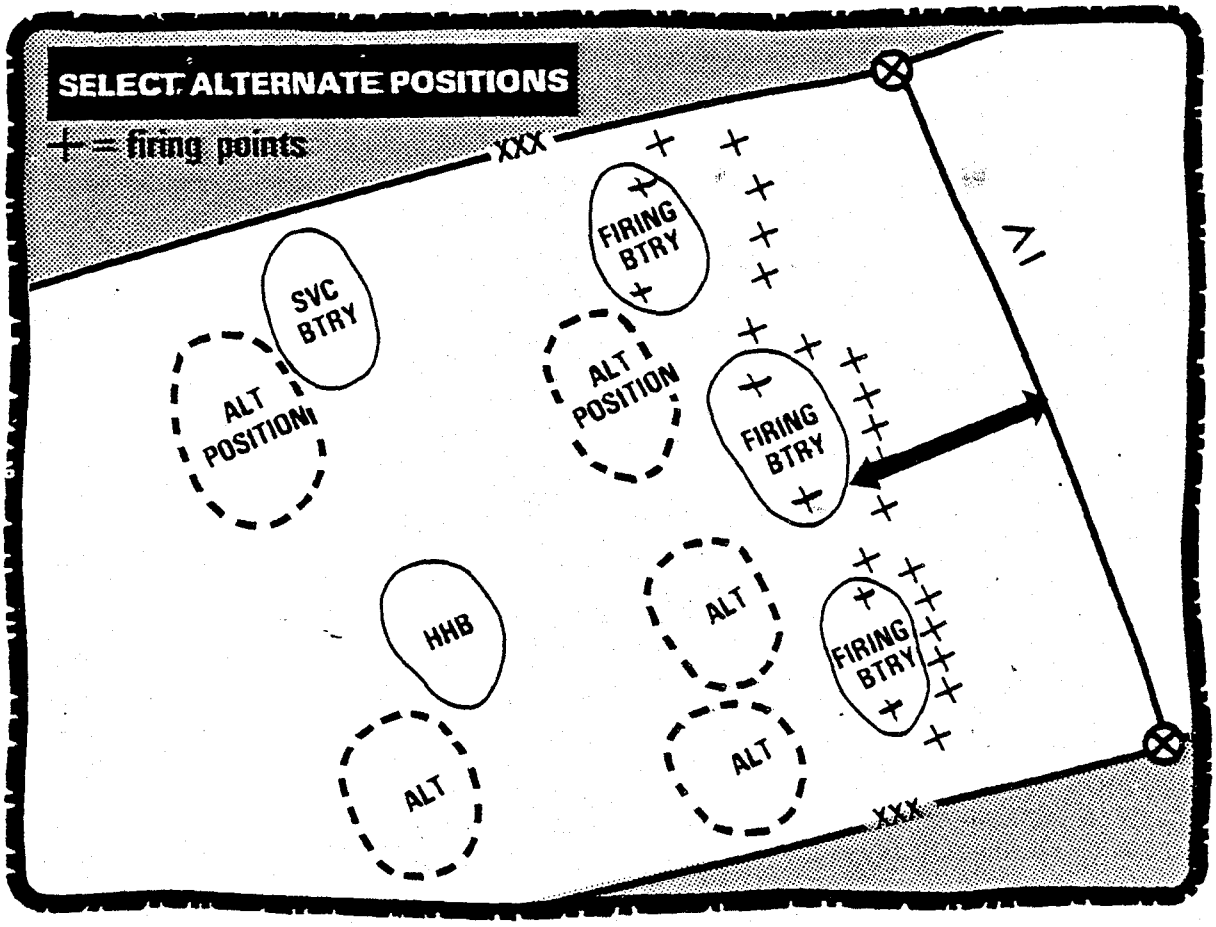
Section II. BATTALION LEVEL

5-2. SELECTION OF BATTALION POSITIONS

After completing the reconnaissance of the area of operation, the battalion commander must consider the selection of position areas for his batteries. In making his decision, he must consider both primary and alternate battery positions. The primary position must allow for the accomplishment of the tactical mission. The alternate position must provide a place where the battery can move if the primary position becomes untenable or unsuitable and the tactical mission can still be accomplished. The alternate position must be close enough to the primary position to permit rapid displacement but distant enough to prevent its being rendered untenable by the same action that affects the primary position. In selecting both primary and alternate positions, it is important that both of these positions provide maximum tactical flexibility. For instance, during offense operations, positions should be selected well forward toward the FLOT to avoid early and untimely displacements in order to keep up with advancing elements. Conversely, positions in the defense should be located far enough to the rear to insure continued fire support if the enemy makes a penetration but at the same time able to exercise maximum use of its range capability. In either posture, maximum use can be made of the excellent range capability of the Lance system, thus preventing frequent and unnecessary moves. In any situation, the battalion commander must take into consideration the radio assets of the battalion and the transmission capabilities and limitations of his communication systems. Battery position areas should be located as far forward as practical to allow the force commander to adequately cover his area of influence.

Lance firing batteries deploy to three separate position areas. The method of deployment for the headquarters and service batteries depends primarily on the tactical situation. Several options are available to the commander: collocation, separate position areas, separate functional areas (maint, ammo). During periods when maximum dispersion between units is necessary, it would be appropriate for the headquarters and service batteries to occupy separate battery positions. This method also may be used when it is necessary to locate the service battery nearer to the SASP or other support facilities. However, the commander must realize that when he uses this option he does not have ease of access to his logistical expertise and he must provide service battery with adequate communiction assets to establish necessary internal and external AM and FM radio nets. When the threat of ground attack and command and control are the basic considerations, collocation of HHB and service batteries would be advantageous. This method provides additional physical security for critical battalion facilities and increases the communication support available to the service battery. The commander would also be able to more efficiently manage and more effectively use his logistical support. The increased size of the combined location, on the other hand, increases the likelihood of detection, provides a more lucrative target for the enemy and also makes finding a suitable position area more difficult.

A special consideration for the Lance battlion commander is the location of rear area installations. Corps and division support facilities may be located in or around the battalion area of operation. The mission and characteristic signature of these units do not lend themselves to good camouflage techniques and the location of a nearby Lance battalion may be discovered inadvertently. Advance liaison prior to occupation of position areas could prevent untimely moves or disclosure of a position area.



5-3. MOVEMENT

The essential ingredients in the successful occupation of a position area are that movement must be accomplished quickly, with stealth and security. The battalion displaces when the battalion commander considers displacement necessary or when ordered by the force artillery commander. The displacement is dictated by the scheme of maneuver of the force commander. When displacement is necessary, the battalion commander coordinates the movement of the battalion with the supported unit and establishes the:

- Method of displacement.

- Time displacement will begin.

- Location of the new position area.

- Expected time of completion.

Based primarily upon the tactical situation, the battalion can move by one of three methods of displacement.

a. Battalion displacements are conducted when there is little possibility of enemy attack. This is the fastest method of displacement; it will seldom be used during actual combat activities because when all battalion assets are moving mission accomplishment is impossible.

b. Movement of one battery at a time is another method to displace the battalion. Use of this method makes individual units extremely vulnerable to enemy attack. The advantage of this method is that it is easier to command and control thus, it lends its use to night moves.

c. Echelon movement is the most feasible method of movement used by Lance. Advantages are:

- Provides the least vulnerability to hostile observation.

- Deceives the enemy as to the size of the unit.

- Provides passive defense against air and ground attack.

When the battalion moves by echelon, two functional elements move separately, but under battalion operational control. Echelon march elements should be designated in the unit standing operating procedures. Command and control and lack of security are some disadvantages that would limit the nighttime use of this method.

Whether the battalion moves by battery or by echelon, there should be no interruption in the operation of fire direction. While the battalion fire direction center (FDC) is moving to the new position, fire direction control can be maintained by a designated firing battery FDC. The local SOP should specify FDC control measures to be used during displacement.

Continuous fire support must also be available during displacements. The movement of firing platoons should be coordinated to allow continuous coverage. To insure coverage, units or platoons should be moved successively to new positions (leapfrogged).

Because of the separation distances between units, command and control measures during displacements require detailed planning and execution. Methods should be rehearsed during training and included in the battalion SOP. Control of battalion displacements can be achieved by the use of checkpoints and road guides. In moves over great distances, radio relay stations should be established to insure

continuous communications. The order of march should be such that march elements do not pass one another in order to get to the new position. There should also be an adequate interval between units to insure dispersion of elements, thus preventing the development of a lucrative target for threat aircraft or artillery.

Supporting artillery or aircraft should be available to provide coverage during ground movement of the Lance battalion. Liaison with nearby fire support units can be extremely beneficial to insure adequate coverage is provided and should be effected through the liaison section. Radio frequencies, call signs, and unit SOPs are areas that should be addressed.

Section III. BATTERY LEVEL

5-4. MOVEMENT CONSIDERATIONS

The headquarters controlling the movement of the battery directs the essential elements of the movement: when, where, and how. These elements of movement may be specifically spelled out in an SOP or operation order, or may simply be implied in the mission assigned.

Depending upon the tactical situation, the controlling headquarters may delegate to the battery the responsibility for any one or all of the essential elements of the movement. The battery commander must anticipate movement. He must plan in advance for displacement to new or alternate positions and announce movement techniques to be used. The battery commander should advise the controlling headquarters of any factors that they need to consider in determining the when, where, and how of the movement.

It is desirable that all key personnel of the battery understand the considerations involved in movement. The unit must be prepared to move--

a. To maintain optimum firing capabilities. The unit should be aware of changes in the FEBA, moving forward as it advances to retain depth of fires and displacing to the rear as enemy advances to preclude engagement. Changes in the unit's mission or movement of the supported unit may also dictate battery displacement. Considerations that may dictate movement in this case could include communications limitations, combat service support, and target acquisition resources. The battery commander must know the tactical situation, anticipate when a displacement is needed, select positions in advance, reconnoiter when possible, and recommend to the commander when and where the battery should displace.

b. When the position becomes untenable. The battery should move whenever it cannot operate effectively because of enemy ground, air, or artillery activity. Depending upon the tactical situation, the battery may displace to its previously selected alternate position. Again, anticipation is the key to minimum disruption. For further discussion

of the tactical considerations in displacement and positioning, see FM 6-20.

5-5. RECEIPT OF ORDER

The battery commander may receive displacement orders ranging from a five-paragraph operation order to a simple authenticated radio message from higher headquarters. He is given the general location of his new position, the time to depart and/or be in the new position, and possibly, routes to be used.

5-6. ORGANIZATION OF THE RECONNAISSANCE PARTY

Depending on the amount of time available to perform the reconnaissance, either a hasty or deliberate reconnaissance will take place.

A deliberate reconnaissance will be conducted by the battery commander with a minimum number of personnel. The detail platoon leader or platoon sergeant, depending on his location, will either accompany the battery commander with his vehicle or rendezvous with him at a predetermined location.

A hasty reconnaissance should only be conducted when there is very little lead time from receipt of movement order to the start point time (SP). The hasty reconnaissance party is similar to the deliberate reconnaissance party and includes members of the advanced party (see paragraph 5-9 for a discussion of the advanced party).

5-7. EXECUTION OF THE RECONNAISSANCE

Prior to departure, the battery commander must give key information to his executive officer (XO) and advanced party personnel to provide continuity if he becomes a casualty. As a minimum, the battery commander should identify:

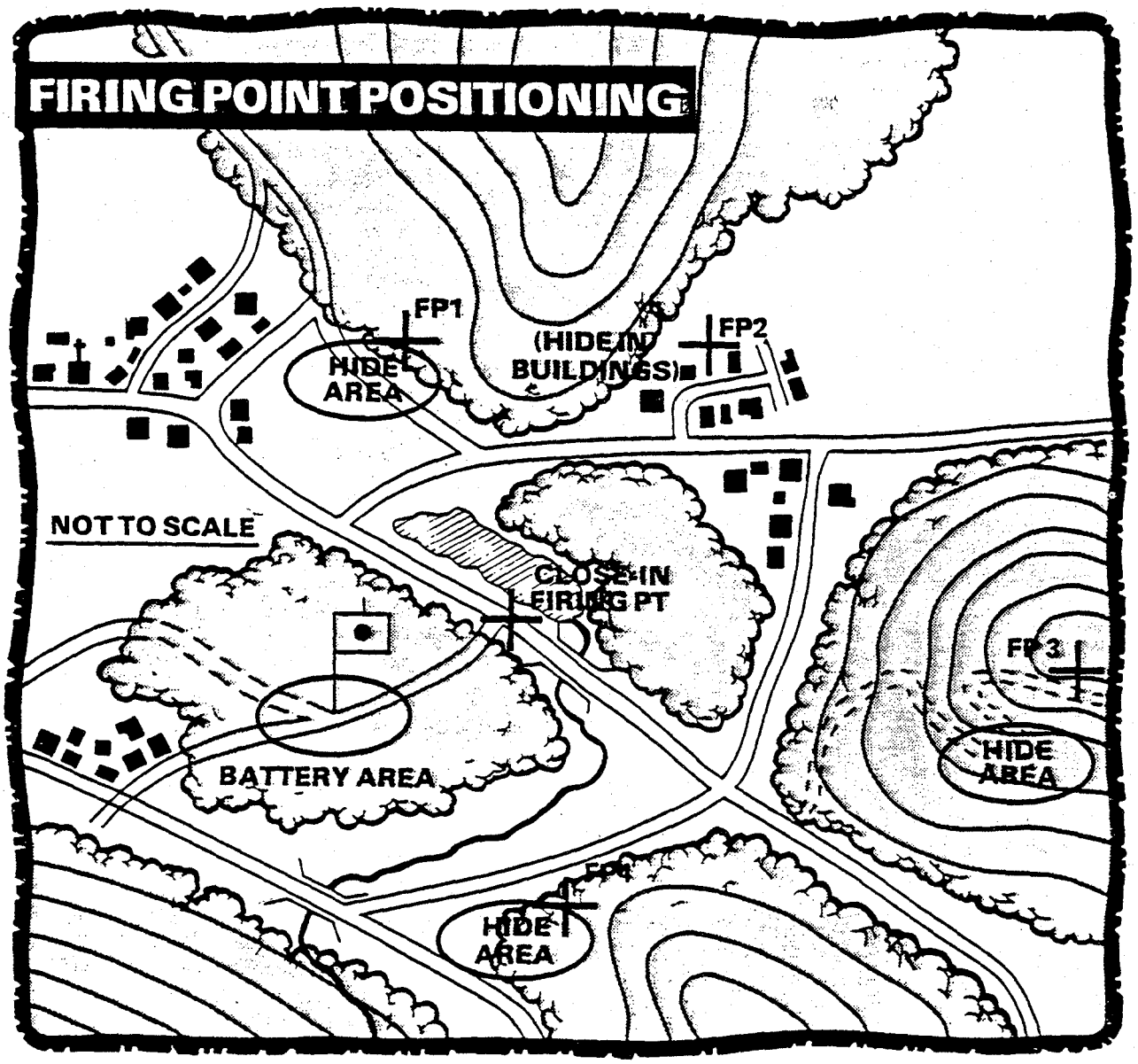
- The tentative location of the new battery position.
- The time of displacement (SP time).
- The method of march.
- The route of march.
- The location of the release point (RP).
- The location of adjacent units.
- The general enemy situation.
- The mission.

The battery commander should also determine the tentative order of march if not already outlined by unit SOP. He must also designate an alternate route in the event the primary route cannot be used.

After making a map reconnaissance, completing his planning, and briefing necessary personnel, the battery commander is ready to proceed. While moving, he verifies the suitability of the primary route. He also checks cover and concealment, location of obstacles, likely ambush sites (preplan suppressive fires as required), the distance, and travel time required.

Upon arrival in the vicinity of the new location, the battery commander should check for a suitable location as outlined in paragraph 5-8 and begin selecting firing points for this position. A minimum of six firing points should be selected forward of the battery position.

Additional firing points may be selected as time allows. Additionally, a close-in firing point may be selected for use on backup fire missions which, should be rarely assigned. Proper planning at all levels, corps to battery, will insure that firing elements have sufficient time to occupy external firing points to perform all missions.



Note. Use of close-in firing points will normally cause the battery to displace to avoid detection and destruction. Displacement causes the unit to be in extreme danger, since the missile firing has already focused attention on the area and the unit movement could be easily seen and attacked by enemy aircraft.

Upon completion of the reconnaissance, the battery commander should return to the battery using the alternate route, checking for those items given above for the primary route. The detail platoon leader and

sergeant return to the survey sections and implement survey operations on the new firing points as soon as possible.

In the event of a "hasty" displacement, the above operations will be carried out concurrently with those procedures outlined in paragraph 5-11 for an emergency occupation.

5-8. SELECTION OF THE POSITION

After the battery commander has reconnoitered various possible positions, final position selection is based on the criteria in the following paragraphs.

a. Selection Considerations. The following items should be taken into consideration when selecting a position:

- Mission.
- Tactical situation.
- Communications.
- Defensibility.
- Trafficability.
- Terrain.

(1) Mission. The position should provide for maximum coverage of the zone of responsibility of the supported force if possible.

(2) Tactical situation. The tactical situation will largely dictate the location of the position area, positioning of firing points, and the use of terrain in defense of the battery.

(3) Communications. The position should facilitate good communications with higher headquarters and the firing points. Due to line of sight requirements for FM communications electronic defilade in respect to the FEBA may not always be possible.

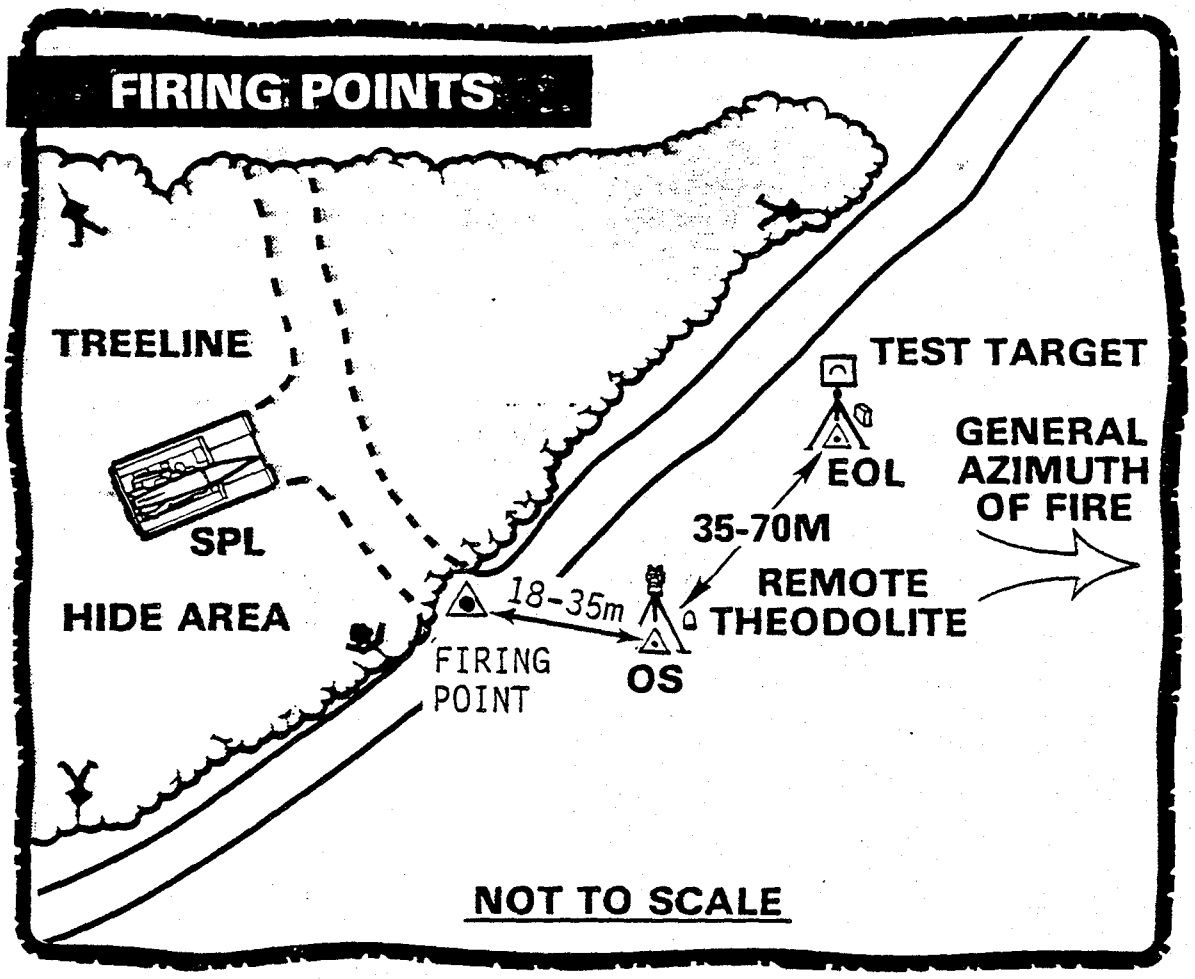
(4) Defensibility. The position should facilitate both active and passive defense so that it:

- Can be entered without enemy observation.
- Offers effective cover and concealment.
- Avoids high-speed avenues of approach into the position from the FEBA.

- Has more than one entrance and exit route, preferably to the rear of the position.

(5) Trafficability. There should be an adequate road network both outside and inside of the position that will allow firing platoons and ammunition convoys easy access to the position. The use of narrow roads with sharp turns or closely spaced trees that would constrict movement of the 5-ton XLWB trucks should be avoided. The soil within the position should be firm enough to allow off-road positioning for all of the battery vehicles (especially loaded ammunition trucks and tracked vehicles).

(6) Terrain. Ideally, a position should be selected for battery occupation that would allow around 30-50 meter dispersion between each vehicle. Less than optimum terrain, cover and concealment considerations, or a high density of trees may dictate that the area be smaller. Firing point locations should offer good cover and concealment in the hide area, and have not more than a 5° (89 mil) ground slope. Ideally a firing point would be a "hole in the woods" or a position on a tree line that is concealed from ground observation. Farmyards, bombed-out buildings or warehouses, are other desirable firing locations that could be used.



5-9. PREPARATION FOR OCCUPATION OF THE POSITION

Once the new battery position has been selected and the order to move has been received, the battery commander assembles the advanced party in preparation for the move. The organization of the advanced party should be tailored for the performance of specific duties. The battery commander takes to the new position only the route guides, personnel, and equipment necessary for the preparation of the position for occupation. A standard nucleus of advanced party personnel and equipment should be established by SOP. The equipment required to prepare the position should be preloaded (if possible) or identified and maintained in such a manner that it can be located and loaded on the prescribed vehicle without delay. Equipment needed for the occupation includes mine detection, radiological monitoring, and chemical detection equipment.

a. Arrival at the New Location. Upon arrival at the new position area, the advanced party should rapidly dismount and sweep the area to be occupied. The sweep is made to insure that the area is free of enemy troops, boobytraps, mines, and nuclear, chemical, and/or biological contamination. Care must be exercised at all times to keep the advanced party and its vehicles concealed. As the advanced party sweeps the area, a skeletal perimeter is established. The sweep should cover the proposed position and also the surrounding terrain from which the enemy could attack. Observation posts should be established after the initial sweep and maintained until occupation of the position is terminated.

b. Selection of Installation Positions. After the position has been secured, the battery commander will select the tentative position that each section of the battery will occupy. Areas that require specific considerations include:

- The fire direction center.
- The field storage location.
- The communications complex.
- The firing platoon and A&T areas.
- The battery CP.
- The service area.

(1) The fire direction center. The FDC should be located somewhere near the center of the battery position. It should be on relatively high and level ground, and have good communications with both battalion FDC and the firing points.

(2) The field storage location (FSL). The FSL should be located in the most defensible part of the battery area consistent with the availability of natural concealment and access routes. Requirements for establishing the FSL are found in AR 50-5 and FM 100-50.

(3) The communication complex. This area will be generally located in the vicinity of the FDC to facilitate rapid message transmissions. It should be on relatively high and level ground. Consideration should be given to tree coverage that may interfere with the radiating patterns of the various types of antennas.

(4) The firing platoon and A&T areas. These platoons should be located where they have easy access to the road network. The turning radius of the 5-ton XLWB trucks must be taken into consideration.

(5) The battery CP. The battery CP should be located where it can best control all of the activities in the battery area.

(6) The service area. Battery support vehicles should form around the perimeter of the battery area. These installations include maintenance, mess, and supply. They should be on firm ground, have good drainage (especially the mess section), and be well concealed.

c. Duties of Key Personnel. Once the position has been established and the locations of the various sections determined, key personnel begin preparation for the arrival of the main body.

(1) The battery commander. The battery commander indicates the primary entrance and exit points and gives the 1SG guidance on the development of the battery track plan.

(2) The first sergeant. The first sergeant establishes the track plan, organizes the dispersion of vehicles throughout the area, and plans the perimeter defense of the position. In forming the track plan, he considers:

- Use of existing roads and trails.

- Locating the entry point to the position where foliage, trees, or other growth meets the main trail or road.

- Provision for separate entry and exit routes.

- Having routes follow natural terrain features such as gullies and tree lines to take advantage of natural cover and concealment.

- Briefing vehicle guides on the track plan. If concealment is critical, the first sergeant may dictate the exact route each vehicle is to follow. Situations in which sharp pivoting will disrupt ground cover must be avoided.

(3) FDC personnel. FDC personnel on the advanced party should set up the RC254 antenna in the designated FDC location so that the FDC will have immediate communications capability upon occupation of the position. Generator emplacements may be dug in and the soil camouflaged.

(4) Section guides. Section guides should familiarize themselves with the route that their sections must take from the entrance to the position to vehicle location. They should be able to lead vehicles to their positions in both daylight and darkness.

d. Preparation for Night Occupation. In addition to what has already been discussed, the following tasks should be performed as time permits to facilitate a smooth and orderly night occupation.

Tentage used in the battery should be erected prior to darkness if possible. A check for light leaks must be made. Light sets and their generators may be brought forward, installed, and checked prior to darkness.

For a night occupation, every vehicle must be guided into position. Guides should be thoroughly briefed and should pace their routes before and after darkness. They should be equipped with filtered flashlights or have reflective tape on the back of their helmets to guide the vehicles. Assistant drivers may be used as ground guides for their individual vehicles after arriving at the position. They will follow the person in their section who came forward with the advanced party to the final position.

e. Main Body Preparations. In the old position, the battery XO will begin preparations for the main body move. Preparation for the move may include:

- Periodically starting vehicles to insure they are capable of operation.

- Uncovering wire or removing it from trees (do not disconnect critical installations or the security hot loop until the last possible moment).

- Replacing section equipment in proper storage locations.

- Reloading off-loaded ammunition and containers.

- Removing camouflage nets, except from Lance-peculiar equipment.

- Completely loading all service elements such as mess, maintenance, supply, etc.

- Taking down tentage.

Note. The XO must know how long the above actions will require. He should plan back from the SP time and initiate march order procedures accordingly.

5-10. MARCHES AND MOVEMENTS

The movement of the battery must be accomplished quickly, with stealth and security. Making such a move requires considerable team training and discipline.

a. Tactical Marches. A tactical march is the movement of a unit or element of a unit under actual or simulated combat conditions. As previously mentioned, the battery may move as part of a battalion march unit, as a battery, or by echelon. Whatever the case, one of several techniques may be used based on the tactical situation. Each technique

has its specific advantages and disadvantages. It is up to the commander to decide which method or combination of methods is best in any particular situation.

(1) Open column road movement. The open column is used for normal daylight movements. It is used whenever there is an adequate road network that is not overcrowded, when enemy detection is not likely, when time is an important factor, and when there is considerable travel distance involved. Vehicle interval is an open column is generally 100 meters.

ADVANTAGES	DISADVANTAGES
- Fastest method of march.	- Harder to command and control.
- Reduced driver fatigue.	- Other traffic becomes interspersed in the column.
- Improved vision on dusty roads.	- Communication within the column is difficult.
- Ease in passing individual vehicles.	
- Ease in dispersing vehicles.	
- Less chance of the entire unit being ambushed.	

(2) Closed column movement. This method of movement is quite similar to the open column, except that the vehicle interval is less than 100 meters. The closed column is used when there is a need for maximum command and control; e.g., during periods of limited visibility or when moving through built-up or congested areas. At night each driver can observe the "cat's eyes" of the blackout markers on the vehicle in front of him and maintain an interval of 20 to 50 meters. If the driver sees two marker lights, the interval is too great. If the driver sees eight marker lights, he is too close. If the driver sees four marker lights, he is maintaining the proper interval. During daylight, the column is kept as compact as possible, and safe.

ADVANTAGES	DISADVANTAGES
- It offers the most effective command control.	- More vulnerable to enemy observation or attack.
- Reduced column length.	- Strength and nature of the column are apparent to enemy observers.
- Concentration of defensive firepower.	- Convoy speed is reduced.
	- Increased driver fatigue.

(3) Infiltration. When the battery moves by infiltration, vehicles are dispatched individually or in a small serials without reference to a march table. This technique is time consuming and vehicle movement is hard to control. It is used when the enemy has good target acquisition means and quick reaction capabilities. Whenever the battery mission requires stealth in moving to a new position, infiltration is the recommended method of movement.

ADVANTAGES	DISADVANTAGES
- It is the least vulnerable to hostile observation.	- Time consuming.
- Ideal for covert operations.	- Most difficult to command and control.
- Provides passive defense against air and artillery attack.	- Small elements are more vulnerable to attack.
- Deceives the enemy as to the size of the unit.	

(4) Echelon movement. The Lance battery commander can increase his chance of survivability by displacing his unit by echelon. Movement of small units exposes only a portion of the battery at a time thus breaking up the definition of the battery to enemy intelligence gathering sources. The composition of each march element must be specified in the unit SOP and exercised during training. Each echelon must be provided with adequate radio vehicles and organized to provide for even distribution of critical vehicles. Echelon leaders must be thoroughly briefed and knowledgeable of the routes of march. Start times and convoy speeds become critical during echelon movement. Control measures such as road guides and road markers should be used to prevent various elements from being lost.

ADVANTAGES	DISADVANTAGES
- Increased survivability.	- Increased command and control. problems.
- Deceives the enemy of the units size and description.	- Increased possibility of elements becoming lost or separated.
- Allows for uninterrupted battery operation.	- Reduced security capability.

(5) Terrain march. The terrain march is an off-road movement to reduce vulnerability of the battery and to avoid traffic tieups. A unit using this type of movement should travel close to hill masses to avoid observation. A terrain march should be conducted when enemy observation or interdiction by artillery fire or air attack is likely. A battery may move safely on a road for some distance and change to a

terrain march at a point where enemy observation becomes likely or vehicle congestion provides the enemy an inviting target. The terrain march should be considered for traveling to the alternate position.

ADVANTAGES	DISADVANTAGES
- Decreased probability of enemy observation.	- Difficult to control.
- May provide the shortest route between two points (although not necessarily the fastest).	- Displacement time increased.
- Allows for bypassing of	- Soil and weather conditions may complicate movement.
- Allows for bypassing of	- Coordination with adjacent units is required.
	- Improper movement will wheel or track marks into the new position.
	- Not feasible for wheel vehicles in rugged terrain.

b. Convoy Control Measures. The following control measures assist in the movement of the battery.

The start point is normally a geographical feature identifiable on the ground and on a map. The first vehicle of a battery convoy must cross the SP at the specified start time. The battery is responsible for determining the route to the SP and the time it will take to get there. If the battery is displacing as part of a battalion move, the SP is also the point at which control of the marching element is normally assumed by the battalion.

A checkpoint is normally a geographical feature identifiable on the ground and on a map. It is used in reporting progress along the route of march.

The release point is normally a geographical feature identifiable on the ground and on a map. The last vehicle of a battery convoy should cross the RP at the specified time. The battery is responsible for determining the route from the RP to the new position area. If the battery is displacing as part of a battalion move, the RP is also the point at which control of the marching element is regained by the battery. The battery commander may send a vehicle from the advanced party to the release point to lead the battery into the new position area.

Route marking aids in the move. The route marking detail marks the route by posting signs and/or personnel at those critical locations where elements of the march might make a wrong turn. Provisions are made to insure the prompt pickup of the route markers/guides when they

are no longer needed. Details concerning traffic control and route marking are presented in FM 55-30 and FM 19-25.

c. Orders. The details given in a march order depend on the time, the tactical and traffic situations, and the completeness of the unit SOP. (In a fast-moving, hostile situation, many orders will be verbal.) The order may be supplemented by strip maps, sketches, and march tables. The principal items that should be included in a march order are:

- Situation.

- Mission.

- Destination.

- Organization, to include order of march and composition of the column.

- Instructions to the reconnaissance parties, route marking and control groups. Instructions should include place and time of departure, mission, special instructions for communications, and time of rejoining the main body.

- Instructions to the main body to include the start point (SP), control points (CP), release point (RP) and times for arrival at, and clearance of, these points; rate of march; and the route.

- General instructions regarding restrictions on use of roads, maximum speed of march units, catchup speeds, alternate routes and detours, restrictions on use of lights, and special instructions regarding march discipline or defense against ground attack.

- Communication instructions regarding the use of radio, messengers, flags, whistle or horn signals, pyrotechnic signals, and hand and arm signals.

d. Organization of the Column. The organization of the battery column varies according to the tactical situation, the threat, and the position area to be occupied. The following points should be considered:

- The column should be organized so that the lead vehicle will occupy the deepest position in the new area.

- If feasible, there should be two air guards per vehicle. One scans the sky forward of the vehicle while the other scans the sky rearward.

- Machineguns should be distributed evenly through the column and should be aimed alternately to the left and right sides of the route of march.

- Canvas should be removed to allow personnel to have their individual weapons poised to return fire if attacked.

- Key personnel should be dispersed throughout the column to preclude losing a disproportionate number of these persons as a result of enemy action.

e. Loading Plans. A loading plan prescribes efficient loading of personnel and equipment for movement. Each vehicle should have one. Loading plans are particularly important in sustained combat because soldiers get tired and inattentive and misplace equipment. Enforcing a good loading plan is insurance that a unit will close into the new position with all its equipment. The loading plan for a vehicle must be such that the equipment most essential to the mission will be loaded last. The loading plan should be recorded and graphically portrayed. Use of the loading plan is an indicator of training, discipline, and esprit de corps. If a loading plan is not prepared or specified by battalion headquarters, each battery should prepare its own. Personnel responsible for devising loading plans should consider the mission, personnel, SOP, and equipment of the battery. Steps in preparing the loading plan include:

- Examining the battery table of organization and equipment (TOE) to determine the personnel, equipment, and vehicles authorized for each section.

- Examining all non-TOE property that must be transported by the battery. This equipment should be carried by the section responsible for its use.

- Listing the personnel and equipment to be carried in each vehicle. Equipment should be located to facilitate identification under blackout conditions.

- Conducting practice loadings to test the validity of the loading plan and adjusting the procedures if necessary.

- Establishing a list of the items that must be removed from the vehicle and carried forward if the vehicle becomes disabled during movement.

The unit should habitually load all TOE equipment during training. Equipment that is not essential to job performance or not frequently used should be left loaded. The more equipment left loaded, the less loading time is required and the less likely equipment will be lost during movement.

f. March Discipline. Officers and noncommissioned officers ride where they can best control and supervise the march of their units. They usually ride where they can control the vehicle driver. The senior person in each vehicle is responsible for insuring that all orders

concerning the march are carried out. To supervise the move, commanders and other designated personnel may require their vehicles to pass other vehicles in the column. All other vehicles maintain their positions until otherwise directed or until circumstances dictate otherwise.

The column must keep moving. The unit SOP should indicate who stops to pick up mission-essential personnel and equipment if a vehicle breaks down. In most cases, the driver stays with the vehicle and the maintenance section stops to assist. If the disabled vehicle cannot be repaired in a reasonable time or recovered by the battery, the position and condition of the vehicle are reported to battalion for recovery. The maintenance section must be prepared to proceed along the route of march independently as soon as possible in order to be available to the remainder of the battery. Accordingly, the maintenance section must have a map and must be thoroughly briefed concerning the route of march.

Each vehicle commander is responsible for watching for signs, markers, signals, and other traffic. He is also responsible for insuring that the driver is alert at all times.

March discipline is attained through training and through internal control within the marching unit. The specific objective of march discipline is to insure intelligent cooperation and effective teamwork by march personnel. Teamwork includes:

- Immediate and effective responses to all signals.

- Prompt relaying of all signals.

- Obedience to traffic regulations and to the instructions of traffic control personnel.

- Use of cover, concealment, camouflage, dispersion, radio listening silence, blackout precautions, smoke, and other protective measures against air, ground, or chemical, biological, and nuclear attack.

- Maintenance of correct speeds, positioning, and intervals between vehicles within the column.

- Ability to recognize route marking signals/signs.

- Use of correct procedures for handling disabled vehicles.

g. Halts. During administrative marches, halts are made at regular intervals or at selected sites to rest personnel, to service the vehicles, and to check the loads. Halts are not normally scheduled for tactical marches.

During an extended vehicle march (1 or 2 days) to a battle area, wooded areas and winding roads should be selected as halting places, since they provide concealment and do not present a straight line of

vehicles for attack by enemy aircraft. During extended marches, halts should be made where vehicles can be dispersed off the road. Cross-roads, railroads, and other identifiable terrain features should be avoided. A column should be halted in an area that provides a 200-meter clear view of approaching traffic at each end of the column.

h. The March Column Under Indirect Fire. The immediate action in defense against hostile artillery fires is to move out of the danger area, report the situation to higher headquarters, and request immediate counterfire. If a battery expects hostile artillery fire during the march, it can reduce its vulnerability by:

- Moving by open column or infiltration.

- Moving under the cover of darkness or during other periods of reduced visibility.

- Moving by terrain march.

i. The March Column Under Air Attack. When enemy aircraft are observed, the convoy commander may take one of three actions, depending upon the situation. He may order:

- The convoy to continue to march at increased speed.

- Vehicles to stop and move to the shoulders of the road.

- Vehicles to disperse and seek cover and concealment.

j. Roadblocks. If the battery is halted by a roadblock, it should use such force as is necessary to clear the roadblock, including preplanned suppressive fires and concentrated fire by available automatic weapons. An attempt to crash through a roadblock with vehicles before it is checked for mines may result in unnecessary loss of equipment and personnel and a complete blocking of the road by disabled vehicles.

k. Ambush. There are two types of ambushes--blocked and unblocked. If the route is blocked, maximum available fire should immediately be placed on the attacking forces. Personnel in the kill zone should immediately dismount and attack as infantry. Staying in the kill zone is the worst thing to do. The portion of the battery that is not in the kill zone must also react immediately. All available firepower should be brought to bear to break up the attack. This includes the use of machineguns, light antitank weapons (LAW) and small arms set for automatic fire. In an unblocked ambush, the battery should increase its speed and move through the ambush area while placing the maximum amount of small arms and automatic weapons fire on the attackers. The rear of the column should be notified.

If the area was identified during the map inspection as a likely ambush site, preplanned suppressive fires should be called in. Otherwise, a fire request is sent immediately to supporting units.

If the ambush or any other enemy action is of such magnitude as to cause the column to be broken up, individual elements should proceed to the new position or designated rally points on their own.

5-11. OCCUPATION OF POSITION

The manner in which the position is occupied depends on the reconnaissance party and the movement techniques used, as well as on the type of occupation itself.

a. Deliberate Occupation. A deliberate occupation, as the term implies, is one that has been planned. An advanced party precedes the unit and prepares the position in advance. The occupation may be during daylight hours following a daylight preparation, at night following a daylight preparation, or at night following a nighttime preparation. A common error in a deliberate occupation is allowing too much activity during preparation, thereby risking compromise before the position is ever occupied. As a general rule, the number of vehicles allowed to go forward should be limited. When the tactical situation allows, a very good method of occupying a new position is to perform the reconnaissance prior to darkness and the movement at night. Nighttime movement following a nighttime reconnaissance is often necessary, but it is very time consuming. The following tasks are accomplished during a deliberate occupation:

- A guide meets the battery at the release point and leads the battery to the entrance of the position area, where the vehicle guides are waiting to lead each vehicle to its selected location.

- A firing platoon is prepared to occupy a firing point as soon as possible after occupation so that the battery can remain as responsive to fire missions as possible.

- The FDC installs the antenna cable from the RC-254 erected by the advanced party and establishes FM communications with battalion headquarters. An operational check is performed on the FDS and all other critical section equipment as soon as possible.

- An FSL is established for nuclear load carrying vehicles immediately upon arrival.

- If wire has not already been laid, each section runs a line to the battery switchboard in, or near, the CP.

- The battery commander takes the firing platoon leaders and/or platoon sergeants on a reconnaissance of the new firing points.

- The first sergeant directs the augmentation of the security and defense of the battery area as personnel become available.

- After the maintenance section has been positioned, has camouflaged its equipment, and has prepared its portion of the defensive position, the motor sergeant or a mechanic contacts the sections to determine any maintenance needs resulting from the move. The battery commander and executive officer are informed of any major problems and the estimated time needed to correct the faults.

Additional considerations for night occupations are:

- Light discipline. Adequate preparation for a night occupation should minimize the need for lights. Vehicle blackout drive and blackout marker lights should be turned OFF as soon as the vehicle is in position.

- Time requirement. The time for occupation is greatly increased.

- Noise discipline. Noise can be heard at greater distance at night.

- Prearranged signals. Filtered flashlights should be used to gain the attention of the convoy commander at the RP and to lead the vehicles into the position.

- Order of march. Each vehicle guide should know where his vehicle is in the order of march. This will enable the battery to move smoothly into position without halting the column while guides attempt to identify their vehicles.

- Movement. Vehicles should not be allowed to move within the position without a guide.

b. Hasty Occupation. The hasty occupation allows little or no time for reconnaissance and advance preparation. It differs from the deliberate occupation mainly in the amount of time available for reconnaissance and preparation. It generally results from unforeseen circumstances and highlights the importance of the battery commander planning ahead and selecting tentative positions and routes to them.

In a hasty occupation, day or night, the battery will require more time to occupy the position, as some preparatory tasks cannot be performed during the limited time available for the reconnaissance and selection phase. The battery commander should insure that vehicles do not bunch up at the entrance to the battery position causing additional confusion during the occupation.

When the advanced party has to prepare a new position at night, the procedures for deliberate occupation at night are used, but less time may be available and fewer tasks may be performed.

c. Emergency Occupation. An emergency occupation will be performed when the battery must evacuate the old position rapidly because of hostile enemy actions.

An emergency occupation will generally be accomplished at a preselected alternate position that may or may not have been previously prepared.

All actions taken during a deliberate occupation should be eventually performed. Priority of activities should be:

- Establish security.
- Establish communications.
- Conduct a casualty report and submit to battalion.
- Those other actions required to become operational.

d. Sustaining Actions. The training and teamwork of the unit in performing the RSOP will culminate with the battery ready to provide timely fires in a minimum amount of time after moving.

Once the occupation is completed and the battery is ready to answer calls for fire, sustaining actions begin. They are continuous until the position is vacated. These actions include completing the position defense and those actions necessary for the battery to remain and fire from the position for an extended period of time. These actions include but are not limited to:

- Camouflage improvement.
- Hardening of critical elements.
- Resupply of ammunition.
- Maintenance.
- Refueling.

Care must be exercised in the manner in which ammunition resupply and refueling are conducted, for they can reveal the location of the battery. If possible, the tasks should be accomplished at night.

Members of the reconnaissance party and advanced party should always be prepared to leave at a moment's notice.

Chapter 6
POSITION DEFENSE

Section I. INTRODUCTION

Lance units, by TOE and mission, are not organized to defend themselves for any length of time against a deliberate ground attack by the enemy. In addition, Lance units have limited capability for defense against air attack. The problem of local security is a critical one for a Lance organization.

6-1. ROUTINE MEASURES

a. Because Lance units are high in priority on the enemy's target list, Lance battalions should be given priority consideration in the assignment of areas.

b. Units should be moved only during the hours of darkness or periods of poor visibility.

c. Lance units will be expected to exercise their capability for local security to the greatest extent possible. If the units are to accomplish the security function successfully, however, they must be provided the appropriate logistical support (small arms ammunition, engineer material, mines, etc.) as well as be kept informed of the local tactical situation (e.g., guerrilla attacks).

6-2. AUGMENTATION

The tactical situation may require that the Lance battalion be augmented by combat units and/or military police units. The addition of these security forces is necessary to enhance the missile unit's ability to prevent nuclear ammunition and classified material from falling into enemy hands.

Ideally, each Lance battalion should be assigned a security force. As a minimum, the service battery and each of the firing batteries should have assets assigned for special weapons protection. However, planning for security must be concentrated on organic assets which the unit controls.

The mission of the security forces is to bolster the self-defense capabilities of the battalion. Specifically, these forces would be fully integrated with elements of the battalion to defend position areas and exclusion areas, and during road marches. Of special importance is the requirement to protect special weapons convoys.

6-3. REAR AREA SECURITY

a. Definition. Rear area combat operations (RACO) are operations undertaken in the rear area to protect units, lines of communications, installations, and facilities from enemy attack or sabotage or from

natural disaster; to limit damage; and to reestablish support capabilities.

Within the rear area, all commanders are responsible for local security for their own units.

Rear area security is a territorial command responsibility. Therefore, when a Lance battalion is operating in the rear area of a division, the unit is under the authority of the division support command (DISCOM) commander or the division G3, as appropriate. When positioned in the corps rear area, the Lance battalion is integrated into the rear area security plans formulated, executed, and under the control of the corps support command (COSCOM) commander. In some cases, support groups assigned as COSCOM elements will have responsibilities for subareas of the corps rear area.

a. Fire Support. Normally, field artillery assets are committed to the main battle area. Within established priorities, elements can be shifted to support the rear area battle. Measures should be taken to insure integration of Lance units into the rear area fire support plan. In addition to artillery support, coordination can be made with attack helicopter units and forward air controllers for USAF support.

b. Ground Support. Adjacent military police, engineer, reserve, or civilian police units can be contacted to provide support in the event of a ground attack or for additional security during displacement and for FSL security.

c. Air Defense. Normally, the Lance battalion will be deployed under the protective umbrella of long and medium-range air defense artillery. Chaparral and Vulcan units may be allocated directly to the battalion elements against air attack. By siting the battalion in proximity of a Hawk unit (within 5 to 10 km), the commander also enhances his protection against low and medium-altitude air attack. Communications are normally established between AD units providing defense to a specific unit and that unit or its elements. Through this link, the battalion will receive warning of an air attack. Often, however, the battalion will have to rely on passive measures, small-arms fire, and organic assets as the primary means of close-in air defense. Specific procedures are discussed in FM 44-23, US Army Air Defense Artillery Employment, Redeye.

Section II. OPERATIONS SECURITY

Organization of the Lance battalion's security plan consists of those measures that the battalion commander can directly control and those he influences. He influences the active defense of the battery by the allocation of resources, enforcing security discipline, and by sound tactical deployment of his units. The battalion commander cannot directly control the protection that he will receive from adjacent units, but he can enhance or influence his security plan by aggressive and timely coordination with these units. The battalion commander must

insure that full advantage is taken of resources available to him and the assimilation of each into an all-round defense system.

6-4. OPERATIONS SECURITY (OPSEC)

General operations security is a command responsibility of the Lance battalion commander. The S3 assists the commander in the overall planning and execution of operations, and has primary supervision for the OPSEC function. The commander must insure that in all staff intelligence, communications-electronics, logistics, maintenance, and administration efforts, OPSEC is considered in order to provide maximum protection for an operation. OPSEC can assist the commander in achieving surprise and security--vital elements to battlefield success. Batteries and staff must practice OPSEC and other coordinated acts to deny operational information to the enemy. Failure to use OPSEC effectively can endanger survivability on the battlefield.

a. OPSEC. OPSEC includes all security measures that allow us to maintain surprise. Used effectively, it keeps the enemy from learning about information leading to a specific operation (the plan); information about why and/or how a specific operation is being carried out (the execution); and/or information about the success of an operation (the afteraction). For additional information, see FM 32-6, SIGSEC Techniques, FM 32-9, ELSEC Techniques, and AR 530-1, Operatons Security.

Section III. DEFENSE OF THE BATTERY AREA

To provide continuous and responsive fires for the supported force, a Lance battery must be able to survive in a hostile environment. Because Lance represents the corps commander's primary tactical nuclear weapon system, the threat's highest priority is the location of these units.

6-5. RESPONSIBILITIES

Whether active or passive, basic fundamentals of defense apply. Planning, preparing, rehearsing, and position hardening are the key elements of defensive operations in the battery area. Planning, coordination, and control of the battery defense are the responsibility of the battery commander. The first sergeant supervises the defense plan by preparing, rehearsing, and directing execution of the final plan.

When formulating the plan, the commander and the first sergeant consider the potential enemy threat, the unit personnel status, and the time available to determine the type and extent of defensive positions to be prepared. The first sergeant determines the final location for crew-served and anti-tank weapons, defines fields of fire, locates observation and listening posts, and insures that the communications required to support the plan are installed, checked, and functioning properly. After developing the battery defense plan, it should be checked by the battery commander at the first opportunity. However, preparation of the position should not be delayed until the battery

commander's approval is received. Once position preparation has begun, the first sergeant supervises continuous improvement of the positions and reinforcement of the defense plan. He also insures that the small-arms and crew-served weapons ammunition resupply plan is prepared and fully understood by all.

6-6. BATTERY DEFENSE PLAN

A Lance battery must be able to avoid detection and/or surprise by the enemy and be able to defend itself it depth and in all directions to provide adequate reaction time against both air and ground attacks. When establishing a perimeter defense, it is critical to coordinate with adjacent units to provide mutual support and to preclude firing into an adjacent friendly position.

a. Considerations. The primary consideration in selection of a battery position is accomplishment of the mission. The defense plan must take maximum advantage of the available terrain. Fundamental terrain considerations include the following:

- Key terrain must be covered by fire and observation.

- Avenues of approach for both ground and air attacks must be covered by fire with predetermined kill zones. Roads, trails, or highways leading into, or nearby, the position will offer the enemy good avenues of high-speed approach and should be kept under observation.

- Good observation provides information and aids in early warning. It denies the enemy the element of surprise and should be coordinated within the unit and between adjacent units when possible.

- Interlocking fields of fire are necessary to insure that no portion of the perimeter is left unguarded. This is especially important to prevent infiltration operations.

b. Initial Actions. A Lance battery is highly vulnerable to attack, especially when it is occupying a new position. The first order of business in establishing a defense must be to provide early warning for the battery to deny the enemy the element of surprise. Initially, this will most likely consist of establishing observation posts and listening posts around the perimeter. The security system is strengthened as time permits.

c. Observation Posts/Listening Posts. These positions must be located a sufficient distance from the battery to provide early warning to give the battery time to react to a threat. They will generally not engage the enemy. OP/LPs are established along probable avenues of approach outside of direct observation of the battery area. OPs are used primarly during daylight hours and should be well concealed from enemy observation. LPs are used during periods of darkness or limited visibility and will generally be closer to the battery position. OPs and LPs will be interconnected with the battery CP via a hot loop and/or

radio, and will be manned by at least two personnel whenever possible. Early warning devices such as trip flares, rocks in tin cans, tanglefoot, boobytraps, and mechanical ambushes should be used along with outposts to cover areas where visibility is limited.

d. Air Defense. The battery commander should take full advantage of the terrain for concealment and coverage to reduce the effectiveness of enemy aircraft. If attacked by aircraft, the firepower of the battery's machineguns and rifles should be directed at the aircraft. Enemy pilots must be able to see and identify a target in order to attack it. The effectiveness of high-performance aircraft is greatly reduced when units take full advantage of terrain for concealment and cover. Units of the battalion should:

- When stopped occupy positions which offer natural cover and concealment. Camouflage vehicles that are exposed. When moving, travel by concealed routes.

- Disperse vehicles as much as possible, not only to make detection difficult, but so that if detected, an aircraft on a single pass can only attack one vehicle.

- Wipe out, as far as possible, track marks made when moving into position.

- Require air guards on vehicles when moving into each position established by the unit.

- Establish an air warning system in the SOP. Include both visual and audible signals.

e. Ground Defense. One of the most effective means of defending a battery against all types of ground attack is through the use of the hasty protective minefield as discussed in chapter 5 of FM 20-32. The primary ground threat to a Lance battery will probably be from small bands of insurgents/guerrillas or long-range reconnaissance patrols. In very rare circumstances, we may incur a mounted attack. In any event, protective minefields and mechanical ambushes, coupled with effective positioning of outposts, offer an expeditious and reliable means of enemy detection.

6-7. BATTERY AREA

While the battery position is being occupied and external security established, the battery commander, along with the first sergeant, must establish perimeter security. Defensive procedures are carried out simultaneously throughout the battery.

a. Weapon Emplacement. A ring of weapons fire is placed around the battery perimeter to provide integrated coverage in all directions. M60 machineguns and organic weapons should be positioned so that they will have overlapping, mutually supporting fires and final protective

fires. M203 grenade launchers should supplement machineguns to provide fire in defilade positions not covered by machinegun grazing fires. Maximum use of natural cover should be used in these positions, supplemented with manmade fortifications where necessary. M203s and M72 LAWs should be placed along avenues of approach near the entrances to the battery area to act as antivehicular defense.

b. Exclusion Areas. Exclusion areas around the field storage locations (FSL) and operation and communication complexes will be established as soon as possible after occupation of the position. Specific defense measures for these areas are discussed in FM 100-50 and provided in the unit SOP. In the event of an all-out attack, defense of the FSL is an untenable concept. If destruction or overrun of the battery is imminent, emergency evacuation, disablement, or emergency destruction (ED) procedures should be employed.

c. Obstacles. Obstacles are used to delay, stop, divert, or canalize an attacking force. Natural obstacles such as fallen trees, ditches, boulders, etc., should be integrated into the defense plan. Hasty protective minefields, as discussed earlier, may be employed effectively against all types of ground threat.

d. Fortification. Fortifications are those measures taken to reinforce or harden existing cover. Again, natural cover and fortification materials should be used wherever possible to aid in concealing the position, as time may not be available to permit elaborate position improvement. In fast-moving situations, hardening might be limited to digging foxholes on the perimeter, burying wire, constructing shelters for prone individuals, and placing sandbags around items of equipment vulnerable to weapon fire. Individual shelters must make maximum use of natural cover and obstacles of the terrain. The commander must exercise caution when hardening a battery position by digging. Care must be taken with the disposition of spoil so that the camouflage effort is not disturbed.

e. Camouflage. A battery that is concealed or cannot be recognized has greatly increased chances for survival. The following principles of concealment lead to better camouflage:

(1) Siting. All terrain has a distinguishable pattern, either natural or manmade. Select the positions for equipment and personnel that will be camouflaged with an eye toward blending camouflage materials with the natural pattern.

(2) Camouflage construction. Use natural and/or manmade material to extend the natural pattern of the area over and around equipment, personnel, and areas of activity. Vegetation can be used effectively for this purpose, but remember:

- Natural vegetation should be cut from the areas away from the battery position. Freshly cut stumps and limbs encircling the battery area draw attention to the area. Mud can be used to conceal fresh cuts.

- Cut vegetation must be replaced as often as practicable.

- Pine limbs do not grow in oak thickets: Make sure the vegetation matches what is naturally in the battery area.

- Camouflage nets are excellent if used properly. Vehicles in an open area under a camouflage net are easily seen (though they may not be readily identifiable). That same vehicle between two trees and under a camouflage net will probably not be seen.

- Remember the natural pattern and blend with it. In urban areas, try to get equipment into buildings or at least in the shade of buildings. Camouflage nets may not blend with buildings, but canvas stretched over a frame will.

(3) Camouflage discipline. Avoid changing the appearance of the area. Each individual in the battery must be careful not to disclose the presence of military activity. Noise and light discipline are two of the more common areas; both are particularly important at night. Noise draws attention and can be identified. Light leaking from a tent is a target for direct fire weapons.

Camouflage should begin immediately upon occupation of position. Lance-peculiar equipment must be the first items to be camouflaged. These include (in order) the SPL, LT, 5-ton XLWB trucks, and the M577 CP carrier. Remaining vehicles are camouflaged as soon as possible thereafter.

The most common signs of military activity in an otherwise well camouflaged area are tracks, spoil, debris, and movement. The track plan must be enforced. Use existing roads and trails. If none are available, create some with heavy vehicles to give the appearance that a unit has moved through the area (the roads and trails must have logical starting and terminating points). Spoil from position hardening must be camouflaged. Debris from the mess area must be policed up and camouflaged. Shine from headlights, windshields, mirrors, and mess equipment can easily be eliminated with scrap canvas, sandbags, and paint, as appropriate. Even the signature of smoke generated by the mess section's stoves can be reduced by only using them around dawn and dusk. Camouflage discipline is each individual's responsibility.

f. Transmission Security. One of the primary methods of compromising a battery position is the violation of transmission security. Because Lance units rely heavily on radio communications, a significant electronic signature is produced. Radio transmissions should be as limited as possible, as short as possible, and made at the lowest power

possible. Wire communications should be used for all internal battery communications. Firing platoons located in the battery area should not be notified of a fire mission over the radio if wire lines have been established.

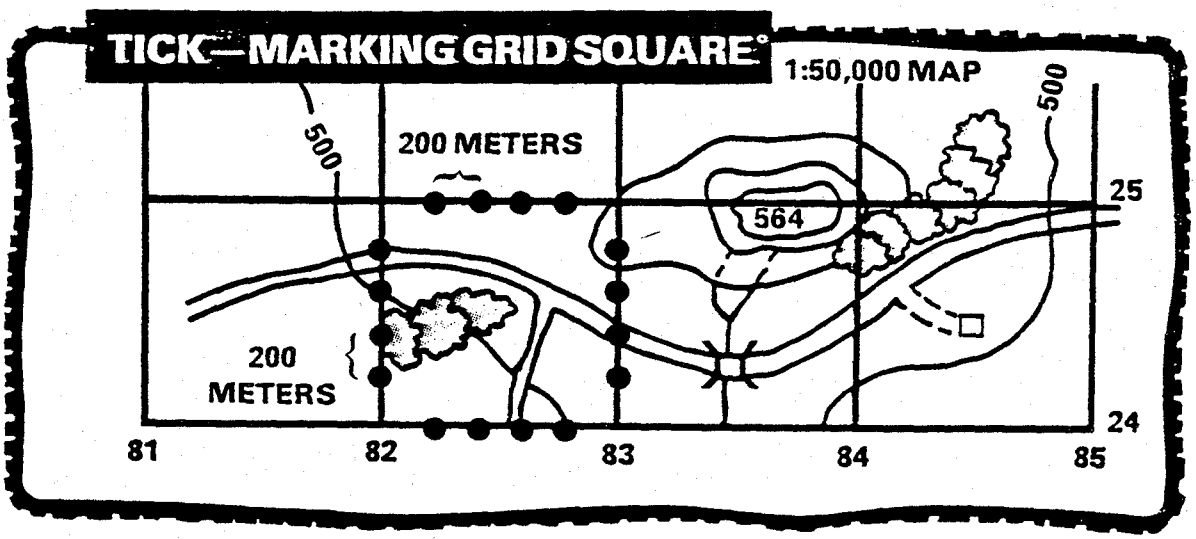
g. Defense diagram. Upon occupying a position, each section must have a predetermined sector of responsibility that makes maximum use of the section's primary weapon(s). As soon as practical, the battery commander/first sergeant should evaluate the defensive plan by studying the defense diagram.

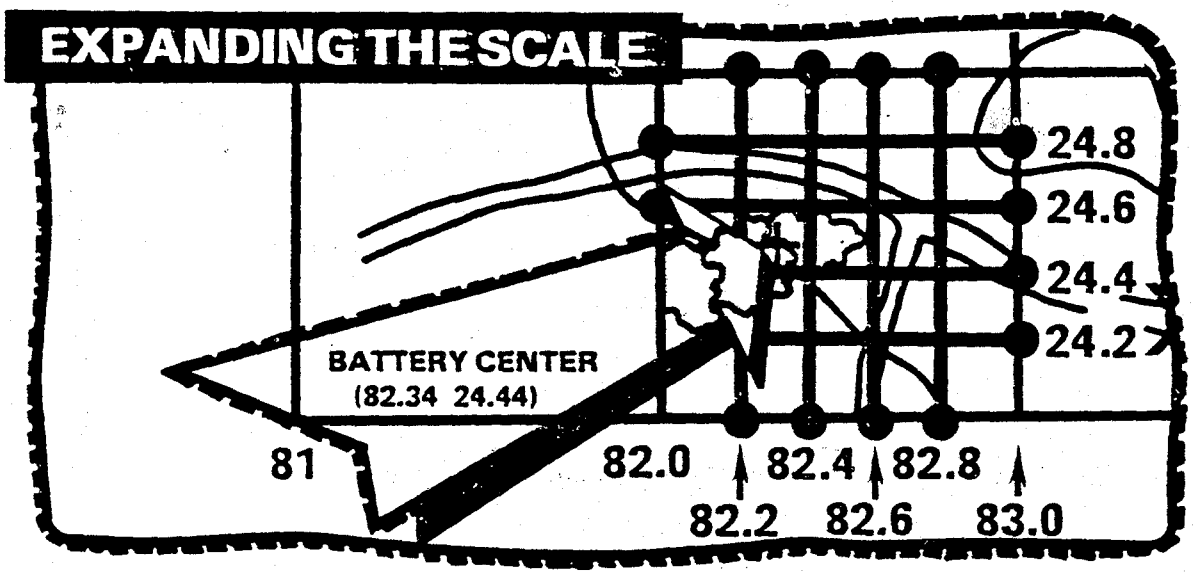
The defense diagram is a sketch, drawn to scale, of the battery defensive resources and is based on the data from the ground reconnaissance and machinegun range card. It includes the fields of fire for other weapons such as grenade launchers, antitank weapons. The diagram is prepared by the first sergeant and approved by the battery commander. A copy is provided to the battalion command post.

(1) Equipment required. To construct the defense digram, you must have a 1:50,000 map of the area, a coordinate scale, a protractor, overlay paper, and a blank 1:25,000 grid sheet that can be obtained from the FDC.

(2) Construction of the matrix. Locate the battery center on the 1:50,000 map. Identify the grid square or squares that contain the terrain features that influence the defense of the battery position.

Place tick marks at 200-meter intervals along the sides of the selected grid squares.

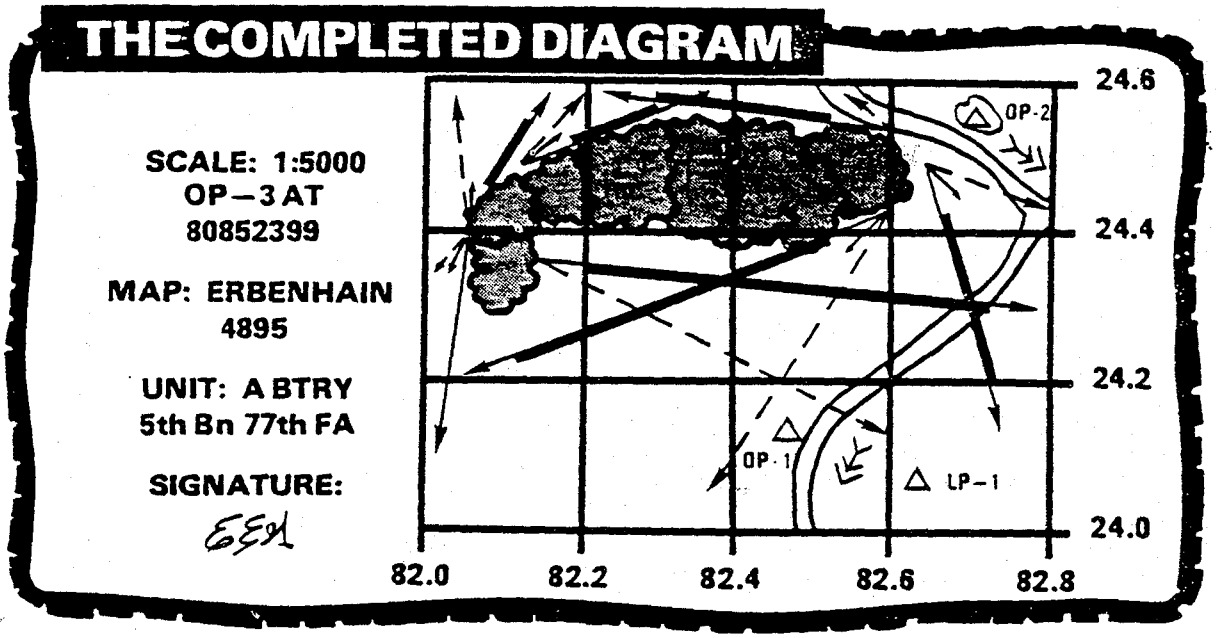




Expand the scale to 1:5,000 by using a blank 1:25,000 grid sheet. In expanding the scale to 1:5,000, each 200-meter block within the matrix correlates with a 1,000-meter grid square on the 1:25,000 grid sheet. Determine which 200- by 200-meter block on the matrix contains the battery center. In the illustration, it is 82.2 24.4. Next, select a square near the center of the blank grid sheet, label this square the same--82.2 24.4. You have identified and labeled the 200- by 200-meter block where the battery center is located. From this point, duplicate the labeling from the matrix on the grid sheet.

Reproduce key terrain. Examine the 200- by 200-meter blocks on the 1:50,000 map that contain key terrain feature that influence the defense. Sketch what you visualize in these blocks on the corresponding squares of the 1:5,000-scale grid sheet. The result will be a map reproduction minus the contour lines and other data not pertinent to the defense of the battery. However, contour lines representing hills or depressions may be included if they are deemed pertinent.

(3) Plotting on the diagram. Use the coordinate scale to plot coordinates and to measure distance on the 1:5,000-scale grid sheet by dividing the indicated graduations on the coordinate scale by 10; e.g., the 1,000-meter graduation is read as 100 meters. Use the protractor for measuring azimuths or direction. Locations should be plotted within 10 meters and directions within 10 mils. On the diagram, the actual location of a weapon is indicated by the base of the stem of the weapon symbol.



- Plot the locations of OPs, LPs, special defense teams, and weapon emplacements indicating their sectors of fire. Insure that sectors of fire overlap.

- Plot the location of obstacles or barriers, mines, and other key defense positions.

- Show the general location of key installations and sections within the battery area.

- Plot a series of protective artillery fire targets on key target list should be submitted to supporting artillery units.

- Machinegun range cards indicate the location (distance and direction from battery center or other known point) and the azimuths of the left and right limits and/or final protective line (FPL). The range card is prepard for all crew-served weapons. It is a record of firing data necessary to engage preselected targets within the sectors of fire during periods of limited visibility. The range card may also be used as a reference to engage targets and to aid in the preparation of the defense diagram. Details on preparing machinegun range cards are in FM 23-67.

h. Priorities of Defense. Often only a small percentage of the battery's personnel are actually located in the battery position. Survey parties are normally operating away from the battery position.

Additionally, if both firing platoons are out on a mission, a portion of the A&T personnel on a resupply run, and the battery commander out on a reconnaissance, it is conceivable that there may only be 25 to 30 people left to defend the entire battery area. If this is the case, it should be SOP that the defensive perimeter be pulled in so that personnel resources are not too spread out. Key installations that must be defended are the field storage location, FDC, and communication complex. If the position is to be overrun, those critical items such as warheads and classified documents must be destroyed to preclude capture by the enemy.

6-8. DEFENSIVE ACTIONS

A key to a responsive and successful defense, as previously stated, is early warning. Monitoring intelligence channels provides one of the best sources of expected enemy activity in the area. Depending on the tactical situation, the commander can be especially watchful for either air attacks, air assaults, subversive or guerrilla activity, or motorized rifle or armor attack.

a. Air Attack. In the event of an air attack, personnel should disperse, take cover, and return fire with small arms and automatic weapons. Weapons should be fired straight up to form a "wall of bullets" through which the aircraft will fly. Chances of obtaining a hit are increased if everyone in the area shoots. TC 23-44 provides excellent guidance on how to engage attacking aircraft with small arms fire. If Chaparral or Vulcan units are allocated to provide air defense of the battery, advance warning of air attack may be received over an alert warning system.

b. Ground Attack. Dismounted forces will often conduct operations at night or during adverse weather conditions. Attacks on a Lance battery will generally consist of:

- Infiltration with attempts at sabotage.
- Sniping activity.
- Ambush of elements entering or leaving the battery area.

These will most likely be carried out by small bands of sympathetic indigenous personnel, insurgents, or guerrillas. These groups would probably not be strong enough to take on the battery as a whole, but can effectively disrupt operations and damage equipment and report our locations to those forces who are able to decisively engage the unit.

If the battery has correctly deployed OPs/LPs and other protective measures previously discussed, the enemy should be detected prior to reaching the perimeter, giving sufficient time for the first sergeant to alert and position his reaction force in the direction of the attack. The remainder of the battery will man predesignated defensive positions around the perimeter. The reaction force is drawn from the various

sections that are in the battery area and should be established by SOP. The force must be thoroughly briefed and well rehearsed to insure speed and teamwork. The reaction force should engage the enemy as he comes into view and should not pursue the enemy beyond the battery perimeter.

Note. Reconnaissance patrols will initially only have the mission of relocating and reporting your position. If the tactical situation precludes any other method of engagement, they may be ordered to return and neutralize your position. These forces are manned by elite personnel highly skilled in their jobs. They must be detected early, and engaged as discussed above.

Although the probability of a mounted attack against a Lance battery is small, the possibility exists. In a breakthrough, armored elements may be advancing rapidly through the area. Initial elements would not be specifically looking for Lance units, but if detected, would either attempt to overrun the position, or report the location to second echelon elements. The best defense against a mounted advance is to avoid detection.

If not engaged after detection, it would be judicious to relocate the unit as rapidly as possible. If the enemy elects to attack, however, protective minefields covered by fire and employment of personnel with LAW and M203s would offer the best defense. Restrictive terrain features around the battery area such as rocks, ditches, and closely spaced trees may canalize an attack effectively or prevent effective enemy maneuver actions.

c. Defense Against Indirect Fire. Because of the battery's location behind the FEBA, it will generally be in range of enemy cannon artillery fire. Other forms of indirect fire that may be encountered are mortar and rocket fire. Enemy mortars can be easily transported by ground personnel to within range of the battery position.

Upon receiving "incoming" an immediate determination must be made as to whether the unit is under "observed fire" or merely sustaining a random barrage attack. If the battery is receiving directed fires, the position should be evacuated immediately and the alternate position occupied to preclude further engagement. With random fires, the commander may opt to take cover or move the battery as the situation/mission may dictate.

d. Nuclear, Biological, and Chemical (NBC) Defense. The Lance battalion must be capable of performing its mission while under a nuclear, biological, or chemical attack. FM 21-40 and FM 21-41 provide guidance relative to the protective measures against the effects of chemical or biological agents and nuclear weapons. These manuals also establish and describe the standards of proficiency for the protective measures employed by the individual and the unit to survive a nuclear, biological, or chemical attack. Defensive measures normally taken by an artillery unit will provide some degree of protection against an NBC attack.

6-9. FIRING POINT DEFENSE

The small size of the firing platoon makes it imperative that the platoon remain well hidden prior to actually beginning firing operations. This is normally accomplished in a hide position in the immediate vicinity of the firing point. Maximum use must be made of natural cover and concealment so that response times are not decreased because of artificial camouflage. When the firing platoon occupies a hide area for any period of time longer than it takes to prepare a firing point, camouflage nets may be used to provide greater passive protection. Security personnel should be stationed near avenues of approach to the position to give warning of an approaching threat.

If the platoon is detected prior to beginning a fire mission, every effort should be made to evacuate the position to avoid engagement. If detected during a fire mission while over the firing point, especially by hostile aircraft, an immediate decision must be made as to whether to continue the mission or withdraw.

Chapter 7
FIRE DIRECTION

Section I. TACTICAL FIRE DIRECTION

There are four fire direction centers with the capability to perform both tactical and technical fire direction within the battalion: one in headquarters battery and one in each firing battery. The battalion fire direction center, under control of the operations officer, has the primary function of tactical fire direction, although it can perform technical fire direction if necessary. Both tactical and technical fire direction are performed using the Lance Fire Direction System (see fig 1). The FDS is a Battery Computer Unit (BCU) with Lance peculiar associated equipment.

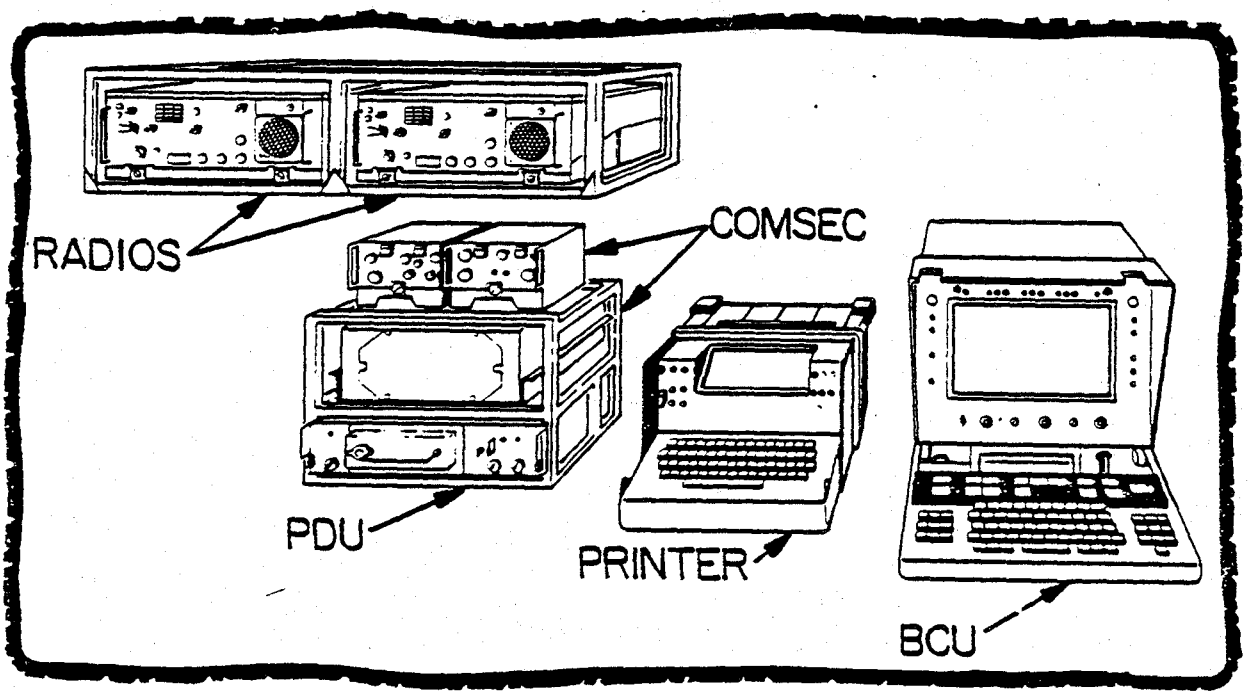


Figure 1. Lance FDS.

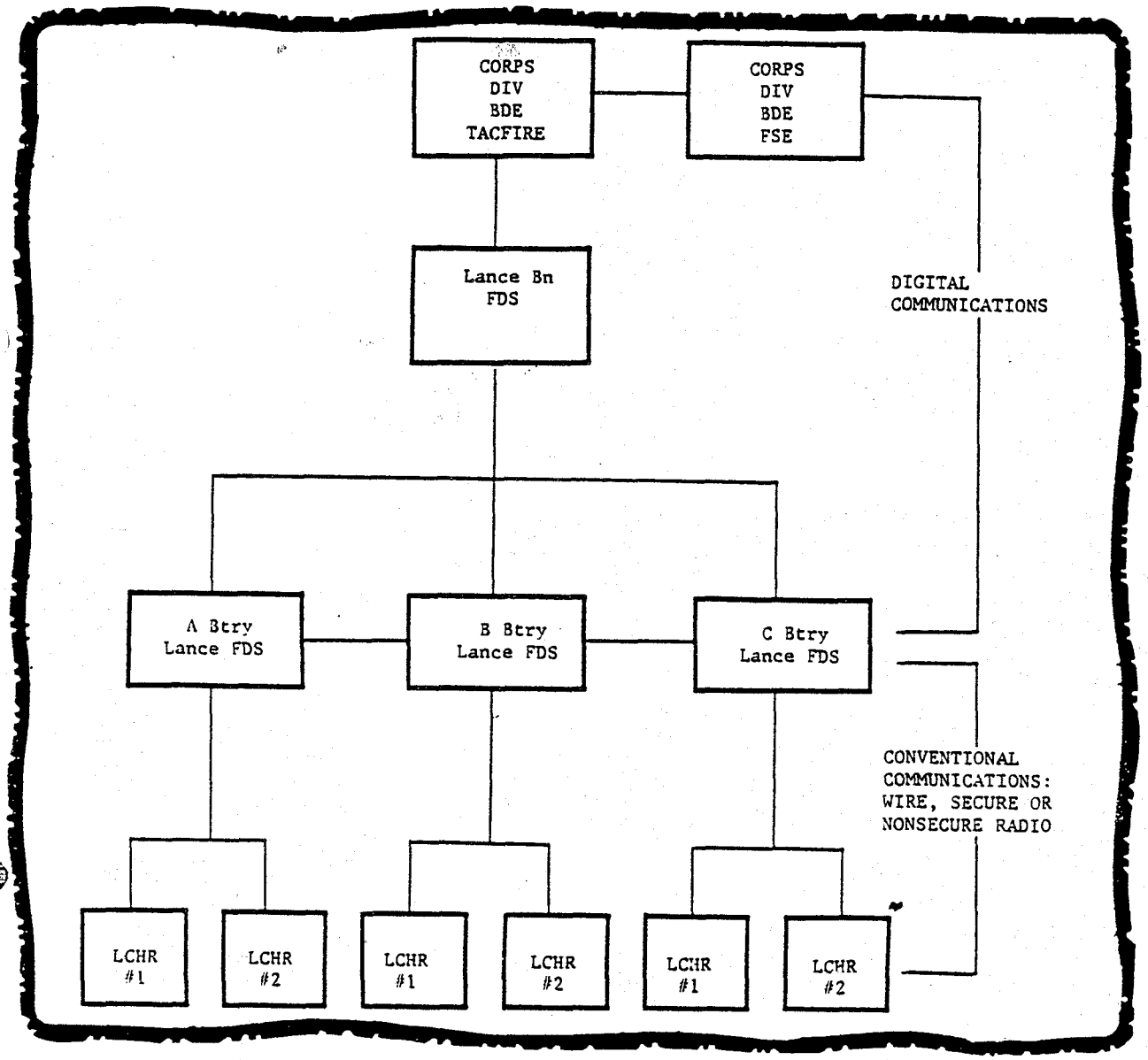
The corps tactical operations center (CTOC) or division main command post receives and processes target acquisition information from national, strategic, and tactical data sources to obtain lucrative targets. These targets are developed, analyzed, and where appropriate, assigned for attack by Lance based on the commander's criteria. Once a target has been designated for attack, the corps FSE will transmit the mission via secure, point-to-point communication through corps to the Lance battalion or through the FA Brigade or DivArty TOC (see fig 2).

Once the information is processed at the corps, DivArty or Brigade TACFIRE, a fire mission is assigned to the Lance battalion. The battalion level FDS will in turn process the fire mission and determine a tactical solution. The main purpose of tactical fire control is to determine the best launcher and firing point combination to use against the target. A second purpose of tactical fire control is to check for possible violations of battlefield geometry stored in the data base of the FDS. This geometry data includes firing point limitations, air corridors, fire support coordination lines, coordinated fire lines, and restrictive fire areas. All this is done automatically by the battalion level FDS.

Once the tactical solution has been determined at the battalion level it is transmitted by digital FM secure to the battery level FDS (see fig 3). It must be pointed out that the FDO has the option to accept, reject or override the tactical solution generated by TACFIRE or the battalion level FDS. Once the fire mission is accepted the battery level FDS will doublecheck the tactical solution before computing a technical solution. If the FDO rejects the fire mission based upon unit to fire or firing point, a new call for fire is generated designating a new unit to fire or firing point. Also the FDO may want to designate the unit or firing point, he does this by using the override function on the FDS. Once the fire mission is processed at the battery level FDS a warning order and fire commands are displayed for transmission to the firing platoon. The warning order and fire commands are sent encrypted or by secure FM voice.

Response time/states of readiness. To have an appreciation of Lance capabilities and limitations, the battalion commander must fully understand system responsiveness. A complete discussion of system responsiveness is found in FM 6-42-1.

The battalion commander must actively seek a desired response posture from the supported unit FSE to allow him to achieve the proper states of readiness for his battalion.



COMMUNICATIONS

Section II. TECHNICAL FIRE DIRECTION

The battery fire direction center is organized for 24-hour operations. Personnel must know Lance gunnery procedures given in FM 6-40-4 and TM 11-7440-283-12-1-2. The battery FDC is capable of computing and verifying accurate firing data. Verification of this data by an outside source (another battery FDC or battalion FDC) is not a requirement but may be directed in unit SOPs in some cases.

Upon occupation of position, the FDC must establish secure digital and voice communications with battalion FDC and other FDCs immediately. Simultaneously, an operations check will be made on the FDS and generators to insure they were not damaged by the move. A restricted area should be established around the FDC as soon as possible. Camouflage nets will be erected.

FDC personnel must be familiar with authentication, release procedures and the "two-man" rule requirements. Procedures for transmitting nuclear release, mating orders, and fire missions, etc., must be established.

Firing point information will be processed and transmitted to battalion FDC as it becomes available. If at all possible, firing point information for a new position should be processed and transmitted prior to departing an old location. Firing point data must also be transmitted to other batteries so that they may assist in fire mission computations if necessary. Firing point data will be transmitted using the fastest and most secure means of communication available (FM secure or AM-SSB/RATT).

Fire missions will be computed, verified, and disseminated to the firing platoons as rapidly as possible. Radio communications will <u>not</u> be used to notify the platoon if it is in the battery area and wire lines have been established. When a battery FDS is not operational, a request for computational assistance will be transmitted to battalion FDC. If the battalion is unable to provide backup computations the firing platoons will be placed under another battery's control. When this procedure is not possible data will be computed using two field artillery computer sets (TI-59), missile or general. The last choice, if none of the above procedures are available, is to initiate manual computations, this technique requires 15-25 minutes to determine firing data. When the battalion FDS becomes inoperational any of the firing battery FDS can reconfigure into a battalion level FDS provided battalion is able to send the designated firing battery all information stored in the data base. The firing battery that is to act as the backup should be established by FSOP. A more detailed discussion of fire direction procedures are in FM 6-40-4 and TM 11-7440-283-12-1-2.

Firing platoon response postures, states of readiness, and mission statuses will be maintained and reported to battalion FDC as changes occur. Prearranged message formats must be established by unit SOP as a backup to the FDS and to cut down on radio transmission time.

The battery FDS will keep track of ammunition expenditures automatically and will transmit this data to the battalion level FDS as required.

The FDC will maintain a 1:50,000 operation map of the area of operation. Battery positions (present, proposed, alternate), firing points, adjacent friendly forces, and the location of possible or confirmed threat forces (guerrilla, insurgents, etc.) in the local area that may affect the unit should be plotted on this map. In addition, a 1:250,000 situation map will be maintained showing maneuver boundaries, FEBA, and overall friendly and enemy operations. Targets and fallout/contamination prediction or location should be maintained on this map. A firing capabilities chart may be used to plot targets in relation to firing points, using plotting procedures outlined in FM 6-40.

The battery FDC will notify battalion FDC when it begins to march order in preparation for a move. The Lance FDS has the capability to process tactical and technical data while the command post carrier is in motion, however, battalion FDC will at that time divert fire missions to other batteries if possible. The FDC track must be organized so that items of equipment are used where they are march ordered as much as possible to preclude undue loading and unloading times when changing positions. If properly set up, an FDC can be tactically operational almost immediately upon occupation.

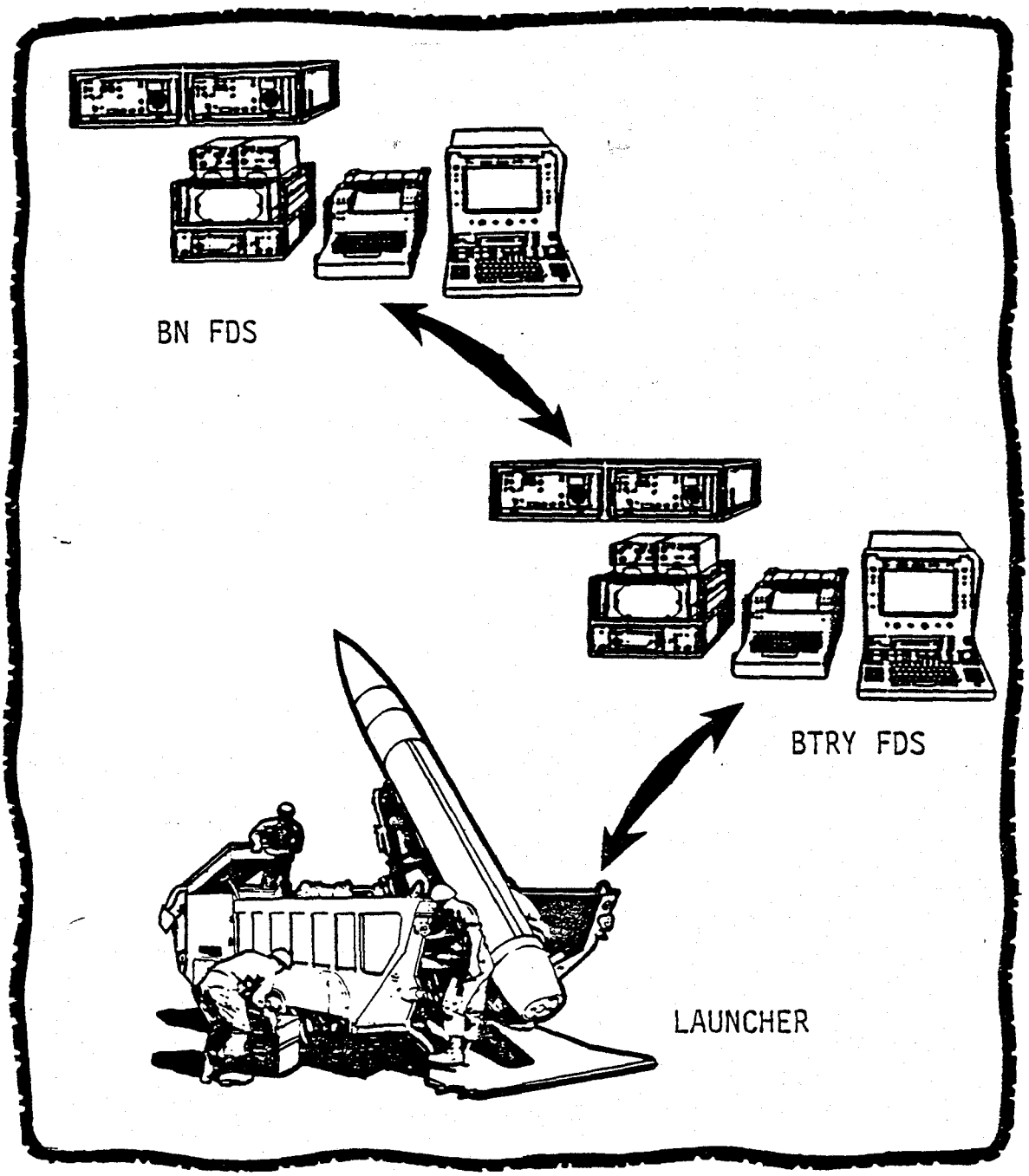


Figure 3. Mission processing.

Chapter 8
DETERMINATION OF LOCATION

Section I. LANCE BATTALION SURVEY

8-1. GENERAL

The mission of Lance battalion survey personnel is to provide timely survey control within prescribed accuracies to the firing platoons. Each battery position will have at least six surveyed firing points established. Firing point survey should be accomplished prior to battery occupation of a new position to enable the unit to be immediately responsive without having to wait for survey control to be established. In addition, the battalion commander must insure that adequate reconnaissance of possible future positions has been accomplished and that a timely movement warning order is given to the unit. This is necessary to provide the survey parties with sufficient time to accomplish a position area survey prior to occupation.

To prevent confusion in the establishment of firing points on the battlefield, the battalion commander must establish adequate plans to prevent duplication of effort by adjacent firing batteries. The area of operation of the supported unit should be divided into sections and each battery given designated areas for the placement of firing points. Areas can be listed in order of priority to maximize efficiency in survey planning.

Section II. BATTERY SURVEY

8-2. SURVEY ORGANIZATION

Each Lance firing battery is authorized one 5-man survey party and one 2-man position and azimuth determining system (PADS) party. The conventional 5-man survey party is equipped with one 0.002-mil theodolite, one survey instrument, azimuth gyro lightweight (SIAGL), one survey electronic distance measuring equipment infrared (SEDME(IR)), plus other survey associated equipment. A survey information center (SIC), composed of a recon-survey officer (RSO), a chief surveyor, a survey computer, and a topographic instrument repairer, is located in the headquarters battery. The primary mission of the SIC is the collection of all available survey data which might be utilized by the battalion, the maintenance of files containing this data, and the timely dissemination of this data to the battery survey elements. The S3, as a member of the Lance battalion staff, serves as the principal adviser to the battalion commander on all matters pertaining to survey. The RSO works directly under the S3, and does the detailed survey planning and supervision and maintains liaison with other agencies (e.g., divarty SICs and corps FA sections) to insure the availability of adequate survey control in the areas of interest to the Lance battalion.

8-3. SURVEY REQUIREMENTS

a. The relatively long range of the missile with either a nuclear or nonnuclear warhead, coupled with the inertial guidance system and relatively small probable error, requires that surveyed locations be determined for each launcher position and an accurate direction be provided for orientation of the missile. Each launcher position should be surveyed using procedures which will insure an accuracy ratio of 1:1000 for position closure, ±2 meters in height, and an orienting azimuth accurate to ±0.4 mil.

CONVENTIONAL SURVEY			PADS	
POSITION	-	1:1000	POSITION	10 min zero velocity corrections
HEIGHT	-	±2 meters	HEIGHT	10 min zero velocity corrections
AZIMUTH	-	0.4‰	AZIMUTH	10 min zero velocity corrections

b. The planned employment of a Lance battalion indicates that batteries will be spread across the corps front, with launcher sites placed well external to battery positions. For tactical reasons, Lance movements normally will be made during hours of darkness, inclement weather, and periods of poor visibility. Thus, it becomes imperative that positions be selected as far in advance of occupation as possible to permit survey control to be extended to launcher locations prior to occupation.

8-4. SURVEY TECHNIQUES

a. If existing survey control is recoverable in the area and control data is available from the battalion SIC, the RSO will select points which will be used as battery survey control points and survey will be extended from these points to launcher sites. The primary means of establishing the position, height and azimuth of the orienting line will be the PADS.

The PADS mission is to provide each launcher position with horizontal, vertical and directional control. Due to the widespread launcher positions, the PADS survey party must know all existing survey control in the area of operations. PADS, when used in Lance operations must extend survey control from 4th order or higher echelon conventional SCP or an SCP which has been established by PADS using 3-6 minute zero velocity corrections (Z-VEL). To complete a survey mission, PADS must be updated over a SCP and move to the launcher position performing 10 minute Z-VELs while en route. At the firing point the OS/OL will first be established and then the launcher position. Optical position and azimuth mark, using a theodolite, is the preferred method to establish the azimuth line, due to the 35 to 70 meter length of the OL. Upon completion of the battery commitments the PADS survey party should continue to survey alternate firing points or support other units as required. In addition, the PADS survey party has the responsibility to

establish battery survey control points when necessary for the battery organic conventional survey party. In the event that PADS is unavailable to fulfill the survey mission, the battery's organic conventional survey party assumes responsibility for the mission.

b. If control is not available and time permits, the survey company of the engineer topographic battalion, theater army, will establish a survey control point (3d order or higher) within 500 to 1500 meters of each battery position. It will also provide a 3rd order orienting azimuth from which the battery PADS party or conventional party can extend horizontal, vertical and directional control to the launcher sites.

c. When a Lance battalion is operating in a division area, survey support for the battalion becomes a responsibility of the division artillery. This will require maximum coordination between Lance and division artillery SICs. Survey elements of a division artillery will establish battery SCPs (4th order accuracy using conventional methods and 3 - 6 minute zero velocity corrections using PADS) for the Lance battalion, from which Lance battery survey personnel will extend horizontal, vertical and directional control to the launchers.

d. When survey control is not available, the firing position can be map-inspected from a large-scale standard A map (1:50,000 or larger). A map spot normally will produce a position which is 50 to 150 meters in error. The RSO or chief of party can eliminate some of this error by careful map inspection. Terrain features (stream or trail intersections) and man-made objects (bridges, RR crossings, etc.) appearing both on the ground and on the map can work to the advantage of the surveyor.

e. The 0.4 mil azimuth requirement for the orienting line of the Lance launcher can be satisfied using several techniques; however, time allocated to determine azimuth is the critical factor. Recommended methods of determining azimuths, listed according to priority, are as follows:

(1) PADS Optical Position and Azimuth Mark (using theodolite).

(2) SIAGL.

(3) Astronomic observation (altitude method).

(4) Simultaneous observation (0.002-mil theodolite).

(5) Direction traverse (0.002-mil theodolite).

If conditions are such that traverse must be used to extend directional control to the launchers, attention must be paid to specific limitations for angular measurements. When the starting azimuth at the SCP is 3rd order accuracy, standard fourth-order directional traverse procedures

will assure the required accuracy of 0.4 mils. Fourth-order directional traverse require closure and adjustment of all surveys.

8-5. AIRMOBILE OPERATIONS

a. A survey team will always accompany the advance party on an airmobile mission, either to locate and identify surveyed stations or to establish (or reestablish) control. The advance party will be followed by the main party with the launcher and crew.

b. Prior coordination with the battalion SIC, to obtain as much survey data of the planned area of operation as is available, is an absolute must. The survey team should consist of the PADS party with enough survey personnel and equipment (SIAGL/Theodolite) to perform conventional survey when necessary. Conventional survey methods will be used to establish position and height and the SIAGL to determine the azimuth of the OL if the PADS is not available. Establishing the azimuths of the OLs is the first priority of the survey team.

8-6. ESTABLISHING A FIRING POINT

The floating firing point method is the primary means of determining the launch point in Lance survey applications. This technique provides the launcher 6,400 mil firing capability.

The term floating firing point is used because the firing platoon leader determines the location of the firing point by directing launcher emplacement at a point along or near the azimuth of fire, 18 to 35 meters away from the orienting station (OS).

To use the floating firing point technique, the survey markers for the orienting station (OS) and the end of the orienting line (EOL) must be intact, and the grid of the orienting station must have been previously determined. For more flexibility, it is advantageous to require the survey party to determine the grid location of all three points used (OS, EOL and FP) and to have the angles and distances determined between these points. This permits the use of any two of the three markers if one is destroyed or unusable.

The battery FDC computes an azimuth to the target to the nearest 0.01 mil, converts this to an orienting angle, and transmits the data to the firing platoon.

Note. This orienting angle is used only to compute the firing point survey and not to lay the missile.

a. Procedures using remote theodolite:

(1) Emplace the remote theodolite over the orienting station and sight on the end of the orienting line (target group). Set the orienting angle received from the FDC on the horizontal scale of the remote theodolite.

(2) Rotate the head of the theodolite clockwise until 0.00 mils is read on the horizontal scale. Lock the horizontal clamping screw.

(3) Using the reticles of the theodolite, direct the emplacement of the firing point stake 18 to 35 meters from the orienting station.

Note. This distance should be predetermined to facilitate FDC computations, i.e., SOP - 20 meters.

Center the stake by using the vertical hairline while simultaneously measuring the distance with premeasured commo wire or other suitable material. This stake now marks the firing point.

(4) If the distance from the OS to the firing point is not predetermined, the data must be transmitted to FDC as soon as possible. Once the FDC receives the distance, new coordinates are computed for the firing point and firing data is computed based on the new coordinates. Fire commands are then sent to the firing platoon and the fire mission continues in the normal manner.

b. Procedures using M2 compass. When time is a major constraint, the M2 compass may be used to position the firing point stake while another member of the platoon emplaces the remote theodolite.

(1) FDC computes an azimuth (0.01 mil) from the OS to the target. The firing platoon leader stands over the OS and using the compass directs the emplacement of the firing point stake along the azimuth of fire.

(2) If not using a predetermined distance, measure the distance from the firing point stake to the OS. Guide the launcher over the firing point stake.

(3) Send the distance from OS to the firing point to the FDC if not using a predetermined distance. Fire commands are then computed, sent to the firing platoon and the fire mission continues in the normal manner.

c. Restricted visibility procedures. When there is a problem with line-of-sight along the azimuth of fire and the firing point cannot be emplaced on the azimuth of fire the following procedure provides a method to shift the location of the firing point.

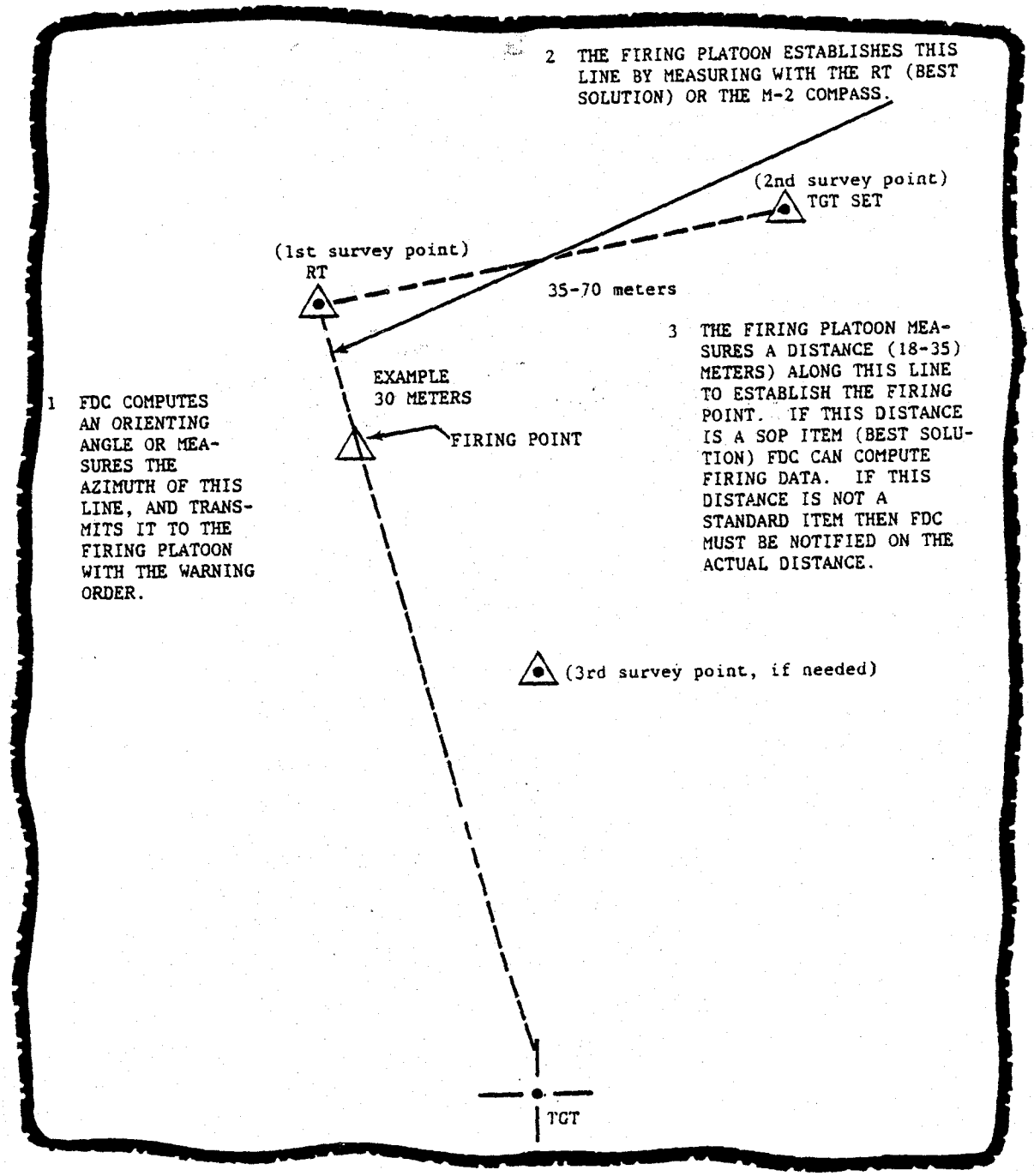
(1) Select a suitable position to emplace the firing point. Take into consideration the azimuth of fire, visibility between the gunner sight unit (GSU) and the remote theodolite, and the 18 - 35 meter distance requirement between the firing point and the OS.

(2) Emplace the remote theodolite over the OS and the test target over the EOL.

(3) Sight the RT on the Target Group and place azimuth of the OL on the RT. Rotate the RT clockwise until it is sighted on the firing point stake.

(4) Transmit both the horizontal scale reading on the RT (to the nearest 0.01 mil) and the distance from the OS to the new firing point to FDC.

(5) FDC then computes firing data which is sent to the firing platoon and the mission continues in the normal manner.


2 THE FIRING PLATOON ESTABLISHES THIS LINE BY MEASURING WITH THE RT (BEST SOLUTION) OR THE M-2 COMPASS.
(2nd survey point)
TGT SET
(1st survey point)
RT
35-70 meters
3 THE FIRING PLATOON MEASURES A DISTANCE (18-35) METERS) ALONG THIS LINE TO ESTABLISH THE FIRING POINT. IF THIS DISTANCE IS A SOP ITEM (BEST SOLUTION) FDC CAN COMPUTE FIRING DATA. IF THIS DISTANCE IS NOT A STANDARD ITEM THEN FDC MUST BE NOTIFIED ON THE ACTUAL DISTANCE.
EXAMPLE
30 METERS
1 FDC COMPUTES AN ORIENTING ANGLE OR MEASURES THE AZIMUTH OF THIS LINE, AND TRANSMITS IT TO THE FIRING PLATOON WITH THE WARNING ORDER.
FIRING POINT
(3rd survey point, if needed)
TGT

Chapter 9
COMMUNICATIONS

Section I. COMMUNICATIONS SYSTEM

The ability of the Lance battalion to provide highly destructive firepower at the critical time and place depends on a responsive system able to survive on the battlefield. The ability of Lance to communicate is an essential element of its command and control.

Lance is only as effective as its communication system. The Lance battalion has no forward observers nor target acquisition capability. Therefore, Lance is totally dependent on its higher headquarters for target acquisition, combat intelligence, fire plans, fire missions, and surveillance of fires.

To insure the above information reaches the Lance firing section, a reliable, flexible, and secure communications system must be employed. To achieve such a system, all available means of communications (i.e., Multichannel, SSB (VOICE), SSB (RATT), FM (VOICE), FM (DIGITAL), Wire, and Messenger) must be effectively integrated into a cohessive system. The various means of communication have different capabilities and limitations, and are employed so that they compliment each other, insuring that total dependence is not placed on any one means.

The key to developing a reliable communications system stems from detailed communications planning and coordination occurring at all levels of command. Due to the increasing demands for communications throughout the battlefield and the limited communications assets available (especially those provided by the Corps Signal Brigade), communications cannot be taken for granted. A partial solution to the extensive planning requirement is to incorporate communications into units Standard Operating Procedures (SOP) at all levels.

9-1. COMMUNICATION RESPONSIBILITIES

a. Commander is responsible. The commander is personally responsible for the adequacy and proper use of the communication system within his command and for its efficient operation in the system of the next higher headquarters. The authority to establish, maintain, control, and coordinate the various communication means within a command may be exercised by a subordinate in the name of the commander. However, the responsibilities of the commander cannot be delegated.

b. Senior to subordinate. The senior unit is responsible for the establishment of communications with its subordinate units whether organic or attached. This responsibility is primarily one of planning and directing the establishment of the linking communication system.

9-2. COMMUNICATION REQUIREMENTS INHERENT TO LANCE BATTALION MISSIONS

The Lance battalion is primarily assigned the mission of general support or general support reinforcing. The requirement for these two types of missions are detailed below:

a. General support. An artillery unit with the mission of general support does not have an inherent requirement for establishing communications with any other unit.

b. General support reinforcing. An artillery unit with the mission of general support reinforcing must establish communications with the reinforced artillery unit.

c. Joint maintenance. Regardless of who is responsible for establishing a communication system, all units being served by the system must assist in restoring communications once communications are disrupted.

Section II. TACFIRE OPERATIONS

9-3. TACFIRE FUNDAMENTALS

The Tactical Fire Direction System (TACFIRE) is an automated system whose fire direction mission accomplishment can only be as effective as the communication links between the TACFIRE computer and outlying peripheral equipment. TACFIRE uses digital communications to pass information and instructions between the Force Artillery Headquarters, Lance Battalion FDC, and Battery FDC.

TACFIRE equipped units use the same communications means as non-TACFIRE units. However, the use of digital signals necessitate several changes within the communications system. First, TACFIRE operates on a real-time basis. This requires sole user wire lines and multichannel circuits to support TACFIRE equipment. It also requires dedicated radio (FM and SSB) assets and dedicated radio nets. The above requirements will necessitate a restructuring of the multichannel circuit allocation charts. It has also resulted in radio nets redesign. Secondly, voice and digital signals are incompatable. This has also resulted in the restructuring of radio nets. Finally, due to the characteristics of digital signals, the planning range of radio communications is reduced. This may require choosing site locations which are closer together or the increased use of radio retransmission stations. For additional information see FM 6-1 and TC 6-1-2.

9-4. TACFIRE RADIO NETS (FIGURES 1 AND 2)

Following is a discussion of the radio nets normally used to pass digital data using TACFIRE. The operation of radio nets used to pass RATT and VOICE is the same as non-TACFIRE operations.

a. Intermediate Headquarters Operations/Fire Net (FM) (digital). The intermediate headquarters is defined as the division artillery or field artillery brigade that the Lance battalion may be operating under.

b. Battalion Operations/Fire Net FM) (digital). This net is used for command and control; tactical fire direction; the collection, exchange, and dissemination of intelligence; and the coordination of fire support between the DS/GS field artillery battalions, MLRS battalion, and the brigade FSE and radar sections.

c. Battery Fire Direction Net (F or FD)(FM)(digital). This is the technical fire direction digital net used in all missile batteries. This net must be uncluttered, responsive, and protected from early exposure to enemy electronic warfare activities.

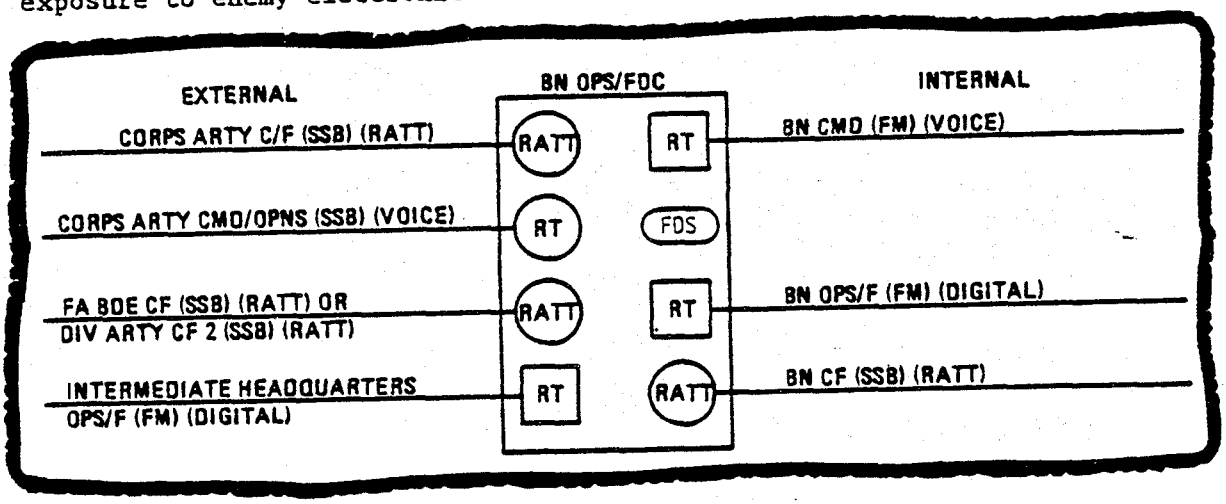


Figure 1. Battalion FDC TACFIRE radio nets.

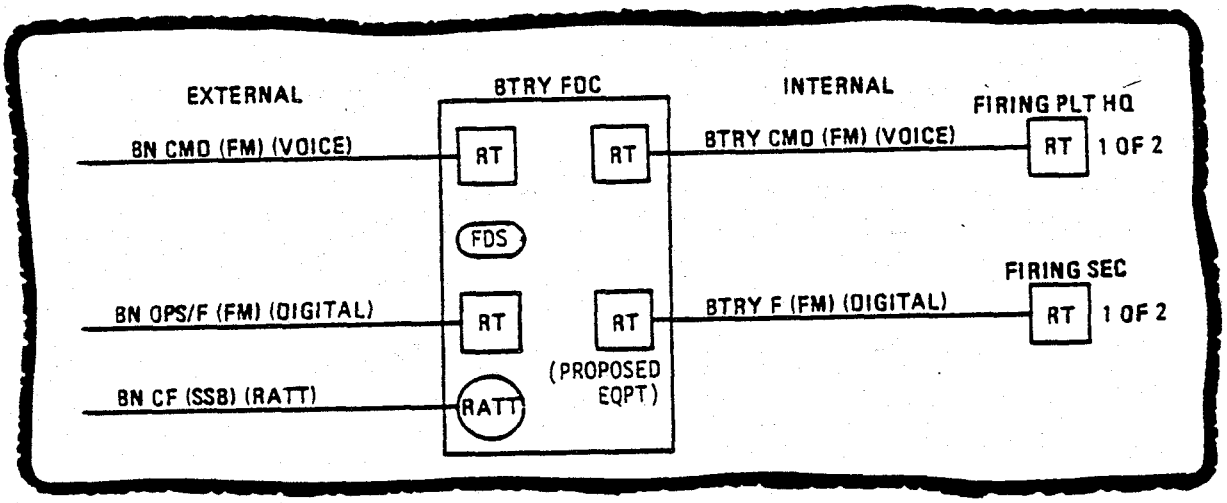


Figure 2. BTRY FDC TACFIRE radio nets.

Section III. BATTALION COMMUNICATIONS (NON-TACFIRE)

9-5. RADIO COMMUNICATIONS (FIGURE 3)

a. External communications with HHB,Corps Artillery. The Lance battalion will communicate with Corps on two radio nets.

(1) Corps artillery/command fire direction net, (SSB)(RATT). The operations center/FDC at the Lance battalion operates in this net with the Corps FSE for the coordination of nuclear fire support. This net is also used to pass command and administrative matters, for processing intelligence information and for the dissemination of meteo rological data.

(2) Corps artillery command/operations net, (SSB)(Voice). The Lance battalion commander and operations section operate in this net with HHB Corps Arty operations/intelligence section for tactical and administrative control, for coordinating and requesting fire support, and for the collection, exchange, and dissemination of intelligence information.

b. External communications with intermediate higher headquarters, FA Bde/DIV ARTY. The Lance battalion may be in a situation when it has a FA Brigade or a DIV ARTY as an intermediate headquarters. In this situation the Lance battalion would monitor the nets shown in figure 1.

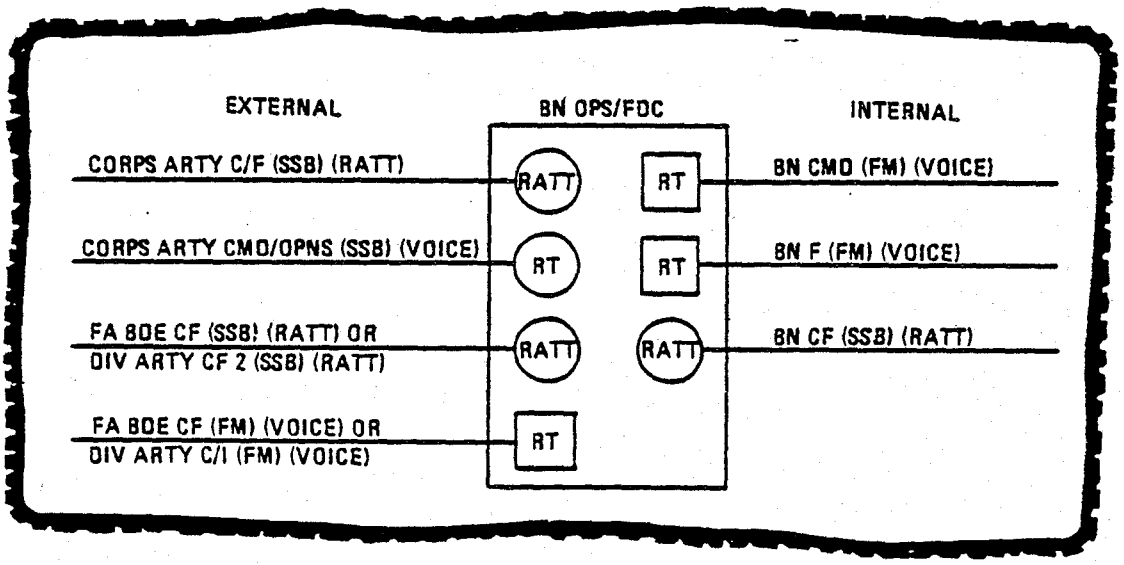


Figure 3. Lance battalion radio communications.

c. Internal communications. Internally the Lance battalion operates in two FM radio nets and one SSB RATT radio net.

(1) Battalion command net, (FM)(VOICE). The battalion command net (FM)(VOICE) is used for internal command/control, critical administrative/logistics support and intelligence needs of the battalion. This net will be established between the battalion commander, battalion operations/intelligence section and the battery commanders. Due to the critical nature of traffic on this net, all stations must have a secure capability, and operate secure when possible.

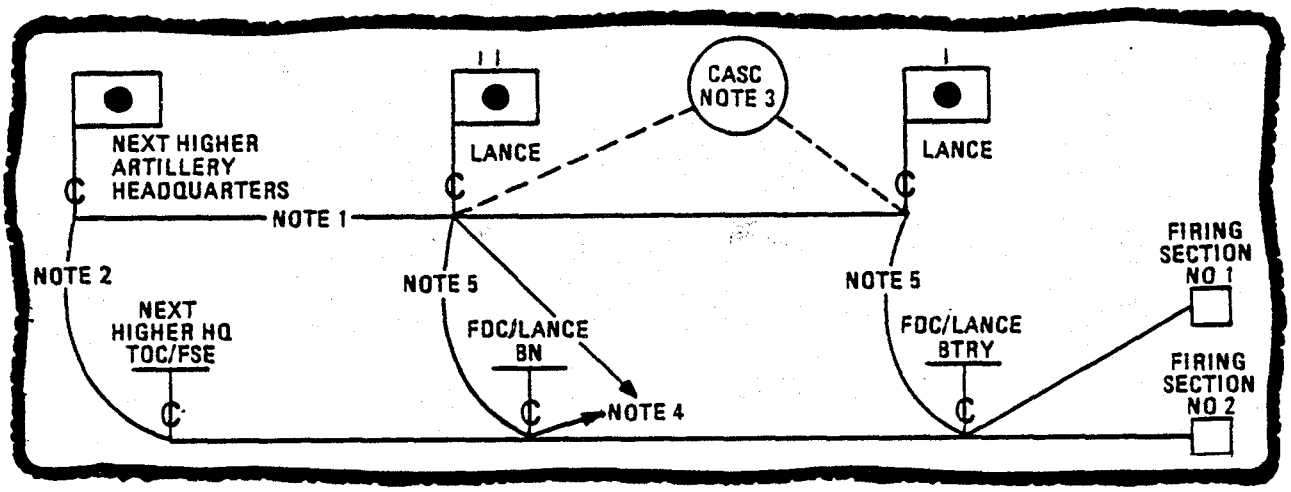
(2) Battalion fire direction net, (FM)(VOICE). This net is comprised of the battalion fire direction center (NCS) and the three firing battery FDCs only. All fire mission, fire support coordination requirements, and firing data exchanges will be accomplished on this net. Because of the critical and easily identifiable nature of the FDC traffic, this net must be secure.

(3) Battalion command/fire direction net, (SSB)(RATT). This net will be between the battalion headquarters and the firing batteries. This net parallels the FM command and FD nets and is used to pass bulk traffic primarily. In instances when the batteries and/or battalion are unable to communicate by FM due to terrain features or distance, this net may represent the only communication link available for transmission of traffic.

9-6. BATTALION WIRE SYSTEM (FIGURE 4)

a. The extent of the wire system installation depends upon the mission, deployment and length of time the battalion is in position, as well as the commander's desires. When time permits, the complete wire system is installed prior to the occupation of the position. This is done to assist in reducing the time required for organizing the position. Full use is made of the existing wire circuits that belong to the headquarters to which the battalion is attached.

b. Installation priority goes to those circuits necessary for fire control and communication with the supported force. The corps radio battalion of the corps signal brigade installs the multichannel terminal facilities at the Lance battalion. Units may also gain access to the corps area multichannel system when located near a corps area signal center (See note 3).



NOTE: 1. Circuit over multichannel.
2. Number of lines vary.
3. Units obtain access to corps area signal center (CASC) when available.
4. Lines are run to reinforced unit when applicable.
5. Command switchboard to FDCs (Priority #1).

Figure 4. Type wire system for Lance battalion.

9-7. MULTICHANNEL COMMUNICATIONS (FIGURE 5)

a. Systems. The corps radio battalion of the corps signal brigade provides multichannel terminals at the Lance battalion headquarters and its next higher headquarters. The multichannel system will consist of 12 channels between each Lance battalion and its immediate higher headquarters. Should there be an intermediate headquarters between the corps headquarters and the Lance battalion, the system between the intermediate headquarters and corps headquarters will be either 12 or 24 channels.

b. Priority circuits. The corps FSE will have a priority circuit to each Lance battalion FDC over the multichannel system in all cases. The O/I section of the HHB, Corps Arty will have a circuit to each Lance battalion operations center. If there is an intermediate headquarters between the corps headquarters and the Lance battalions, it will act as a controlling headquarters for the Lance battalions. The FSE at Corps will have an additional priority circuit to the intermediate headquarters TOC. An additional priority circuit is provided between the O/I section and the intermediate headquarters TOC. The FSE at CTOC and Corps TAC CP will have a priority circuit to the intermediate headquarters.

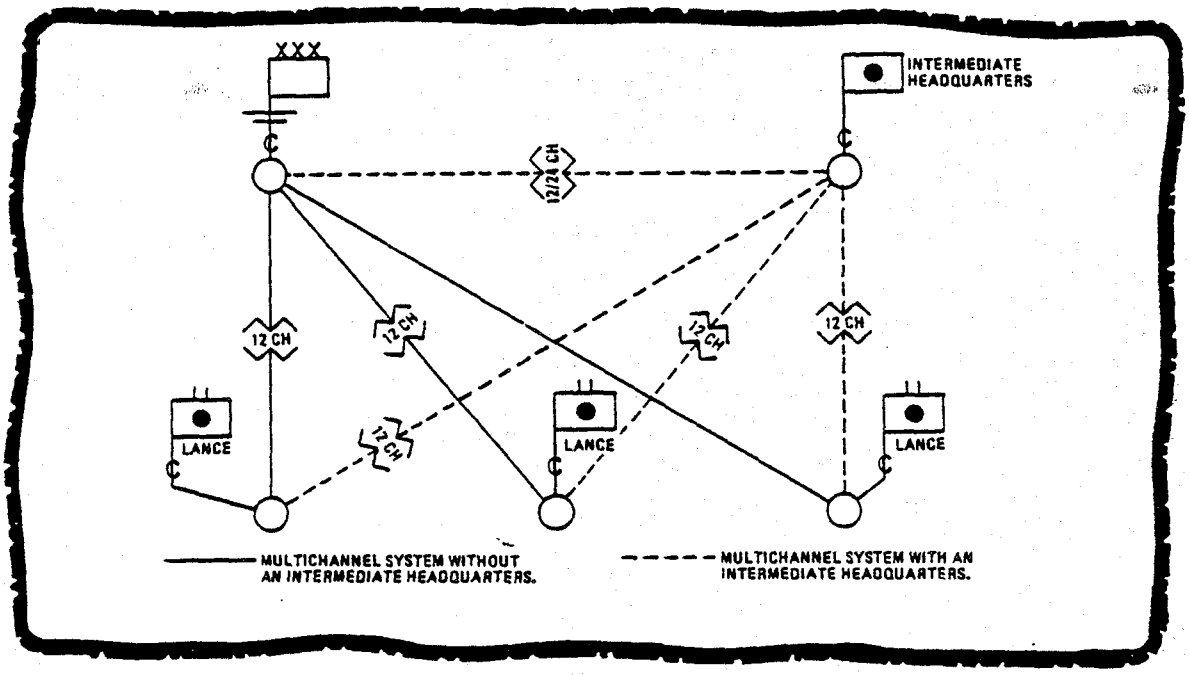


Figure 5. Lance multichannel communicatiions.

Section IV. BATTERY COMMUNICATIONS (NON-TACFIRE)

9-8. RADIO COMMUNICATIONS (FIGURE 6)

a. External nets.

(1) Battalion command/fire direction net (SSB)(RATT). This is a RATT net between the battalion headquarters and the firing batteries. It is used to supplement the FM nets and is used for passing bulk traffic such as reports, firing point lists, etc. Fire mission traffic, if passed on this net, will have priority over all other traffic.

(2) Battalion command net (FM)(VOICE). Stations in this net include the battalion commander and operations section, the battery commanders, and the battery FDCs. This is a battalion controlled net and is used for internal command/control, critical administrative/logistics support and intelligence needs of the battalion. Due to the critical nature of traffic on this net, all stations must have a secure capability (using KG 31/KY 57).

(3) Battalion fire direction net, (FM)(VOICE). This secured net is used to pass all fire mission data and fire support coordination requirements along with firing point information and target lists not passed on the battalion command net or battalion CF (SSB)(RATT) net. Battalion FDC and the three firing battery FDCs are the only stations in this net.

(4) When the battalion is assigned a GSR mission, the Lance firing battery may be required to operate in the reinforced unit's radioteletype net (SSB)(RATT). For example, if the Lance battalion is reinforcing a division artillery, the firing batteries may be directed to operate in the division artillery CF 2 (SSB)(RATT) net. FM radio nets remain the same as when in a GS role.

b. Internal nets.

Battery command/fire direction net, (FM)(VOICE). Each firing battery has its own CF net to facilitate command and control of various battery elements when they are not in the battery area. This net's primary function is to transmit fire mission data between the battery FDC and the firing platoon. Because of the characteristic nature of this data, this net will be secure. NCS for this net is the battery FDC.

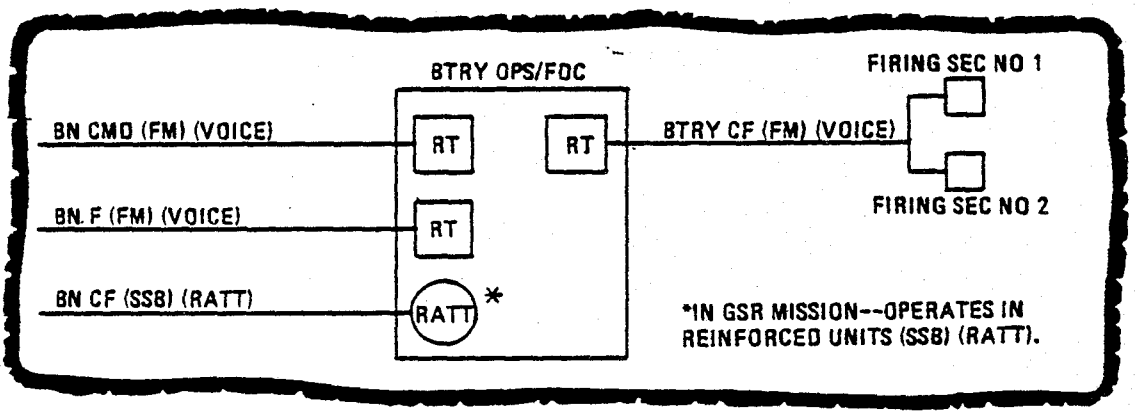
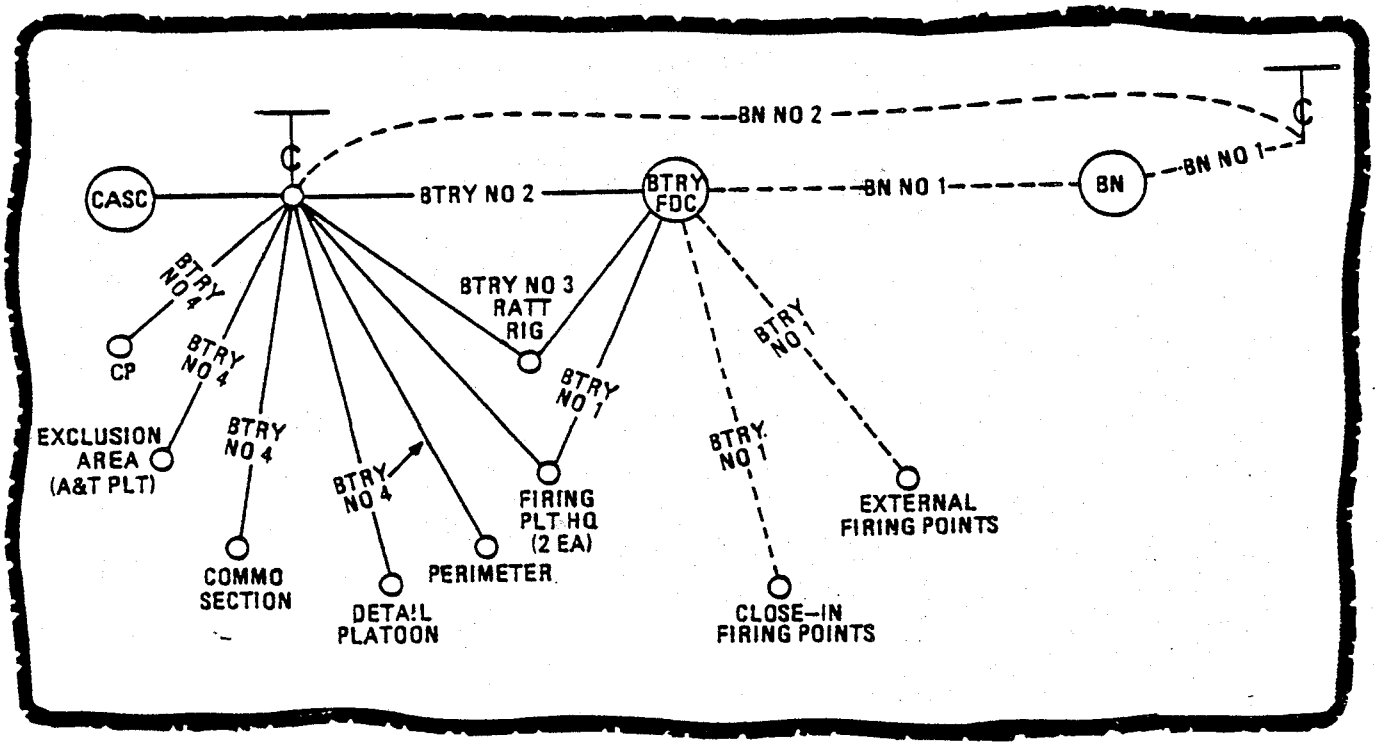


Figure 6. Lance firing battery radio communications.

9-9. WIRE SYSTEM (FIGURE 7)

Establishing an internal battery wire system is the responsibility of each individual section upon occupation of positions. The battery communications chief or his representative will supervise the installation of battery wire between each section and the battery switchboard. When located in the vicinity of a Corps Area Signal Center (CASC), the battery wire team can install a wire line to extend the battery wire system into the corps area multichannel system.



1. ESTABLISHED AS TIME AND DISTANCE ALLOWS (1ST PRIORITY, BN AND BTRY).

2. ESTABLISHED AS TIME AND DISTANCE ALLOWS (2ND PRIORITY, BN & BTRY).

3. DIRECT LINE TO FDC.

4. INTRABATTERY COMMUNICATIONS REQUIREMENTS.

Figure 7. Lance battery wire system.

NOTE: Secure land line teletypewriter capabilities are available from BN FDC to BTRY FDC using Communications Terminal AN/UGC-74A(V)3, with TSEC/KW-7.

Chapter 10
COMBAT SERVICE SUPPORT

Section I. GENERAL

10-1. OVERVIEW

The corps commander must insure that his combat force has the necessary means to fight effectively at the outset of the battle and to fight continuously thereafter. This concept is particularly true in the employment of a Lance battalion. When the corps commander concentrates his forces at the critical time and place, he is in effect concentrating weapon systems. Therefore, in order to use Lance effectively, he must also concentrate his combat service support resources to insure that the Lance battalion remains armed, fueled, maintained, and manned by soldiers capable of doing the job. The agency that assists the commander in accomplishing this task is the corps support command.

a. Corps Support Command. The corps support command (COSCOM) provides the required combat service support for the corps force. It has the responsibility to provide intermediate direct support (DS) and intermediate general support (GS), supply, maintenance, field services, personnel and administration, transportation, and health service support to nondivisional units such as the Lance battalion.

b. Ammunition Support. The responsible agency for ammunition support within the corps zone is the ammunition group under the control of the COSCOM. This group is structured to accommodate a variable number of ammunition battalions assigned conventional and special ammunition companies. The number and type of companies under the battalion is dependent upon the size of the supported force. The Lance battalion, as a nondivisional unit, will receive its ammunition support from these units. Specifically, the battalion will draw conventional ammunition (small arms) from an ammunition supply point (ASP) established by the ammunition company conventional operating in a DS/GS role. Special ammunition is drawn from a special ammunition supply point (SASP) established by a special ammunition company DS/GS.

Supply point distribution will be the normal method of initially providing ammunition to all using units. Therefore, the assembly and transport sections of the Lance battalion will draw missile and warhead sections in containers from the SASP and transport them to the battalion area. These sections will also be responsible for drawing and transporting conventional ammunition from the ASP.

Resupply of nonnuclear Lance will be accomplished by Corps transportation delivering the missiles to the brigade trains area where A&T sections will be met. Resupply of nuclear Lance will be accomplished in the same manner as initial issue.

c. Maintenance Support.

(1) Conventional maintenance. The direct support forward maintenance company provides direct support maintenance and repair parts supply for mechanical, armament, and communications equipment in the Lance battalion. If positioned further into the rear area, the battalion will be provided intermediate DS maintenance services from the rear DS maintenance company.

Intermediate general support maintenance services for the battalion are provided by two units: light equipment GS maintenance and the heavy equipment GS maintenance company. These organizations are oriented to repair of smaller end items (e.g., calibration instruments) as well as larger end items such as wheeled vehicles.

(2) Missile-peculiar maintenance. The principal source of support for missile-peculiar equipment (less warhead section (WHS)) is the rocket and missile support detachment. This unit is capable of, and may be assigned, a direct or general support role. These missile support teams will provide missile direct support service for Lance FA battalions and special ammunition supply points. These teams are 100 percent mobile and their prime responsibilities are to provide command, control, and overall supervision of maintenance by using the land combat support system (LCSS); provide technical control and supervision in the inspection, testing, modification, and repair functions; perform inspection, testing, modification, and repair functions; and provide on-site component repair or replacement. Teams EG and EJ are the two units whose prime responsibility is support of Lance.

d. Other Services. Services, other than those already described, are provided to the Lance battalion by various battalions, companies, detachments, and cellular organizations assigned to the COSCOM. These units are deployed throughout the corps to provide nondivisional units the following types of support:

(1) Personnel, morale, and administrative--provided by the personnel and administration battalion.

(2) Finance--provided by teams from the finance service organization.

(3) Supply and field services--provided by the supply and services battalion. Supply activities include receipt, storage, and issue of all classes of supply except class V (ammunition) and class VIII (medical material). Field services support includes laundry, bath, clothing exchange, bakery, clothing renovation, salvage, post exchange sales, and provision of general duty labor.

(4) Medical support--provided by the medical brigade on an area basis. Troop clinic type services are provided to nondivisional troops by medical clearing companies or medical detachments.

Section II. OPERATIONS

Combat service support consists of the total logistical and administrative effort required to maintain the Lance battalion's capability to fight. Involving provision of a service, an item, or technical assistance, combat service support is a critical element of combat power. Indeed, the ability of the battalion to accomplish its assigned mission will vary directly with the effectiveness of the combat service support system in arming, fueling, fixing, and manning of the weapon systems in the firing batteries. The proper employment of combat service support troops and resources will be vital to success on the battlefield. The Lance battalion commander and his staff officers must know and apply certain key principles in the planning and execution of combat service support. The thrust of combat service support within the battalion must be forward support to the firing batteries through the austere supply, proper application, and efficient use of resources available.

10-2. COMBAT SERVICE SUPPORT CHANNELS

To understand the functions of key personnel and the employment of sections within the battalion in providing support to the batteries, it is necessary to place the battalion in the overall combat service support perspective. The logisticians of the Lance battalion will habitually deal both with higher tactical headquarters and with higher echelon support units. As stated in chapter 4, the Lance battalion will normally be retained under control of the corps field artillery section or be attached to a field artillery brigade headquarters. Similarly, a field artillery brigade with Lance units may operate directly under the corps field artillery commander or may be attached to a division.

Note. Although the status of attachment to a division traditionally includes the provision of combat service support to the attached unit or force, corps artillery units, such as Lance battalions, will continue to receive their combat service support from the COSCOM. This modification to convention is designed to avoid an unnecessary logistical burden on the division, but requires increased coordination among corps and division logisticians at all levels.

For a more comprehensive treatment of combat service support within the corps and the division, see these publications:

a. FM 63-1, Combat Service Support Operations - Separate Brigade.

b. FM 63-2, Combat Service Support Operations - Division.

c. FM 63-3, Combat Service Support Operations - Corps.

d. FM 100-5, Operations.

e. FM 100-10, Combat Service Support.

f. FM 101-10-1, Staff Officers Field Manual: Organizational, Technical, and Logistic Data.

10-3. SUPPLY OPERATIONS

Supplies are those items required to equip, maintain, or operate a military force. Supply operations involve the determination of requirements and the requesting, procuring, storing, and distributing of items to fulfill those requirements.

To facilitate supply management, supplies are grouped into 10 major classes. The following paragraphs provide a general discussion of the classes of supply as they pertain to the Lance battalion. FM 38-24, Classes of Supply, provides an amplification of classes and subclasses of supply prescribed in AR 11-8.

a. Class I supplies consist primarily of subsistence items. Water is included in this category. Strength reports act as the triggering device to cause class I to be shipped to the Corps. Rations are requested from the direct support units by each food service sergeant by number and type of meal [meal ready to eat (MRE), standard B ration, theater menu, etc.] needed to support operations.

b. Class II supplies are secondary items of equipment authorized in TOEs and common table of allowances (CTA), including expendables and consumables. It includes clothing, individual equipment, tentage, organizational tool sets and kits, hand tools, and administrative/housekeeping supplies and equipment. It does not include repair parts. When a class II item is lost, destroyed, or worn out, the batteries request replacements through the S4, who consolidates requests and forwards them to the appropriate COSCOM direct support unit. COMSEC equipment is requested and distributed through cryptograhic channels. This is normally accomplished by coordination between the battalion cryptocustodian and the custodian at the next higher headquarters.

c. Class III consists of petroleum fuels, oils, lubricants, and related items. Most class III items do not require formal requisitioning; empty fuel vehicles and containers presented at a distribution point are sufficient to obtain POL. Fueling in position by battalion POL trucks is the normal procedure for the firing batteries.

d. Class IV consists of items for which allowances are not prescribed, such as construction, camouflage, barrier, and fortification materials. Requisitions normally require command approval and are submitted through command channels.

e. Class V consists of ammunition of all types. Also included are components of class V items and parts or assemblies which are issued through class V supply channels. Of primary interest to the Lance battalion are warhead and main missile assemblages fired by the firing

sections. Supply procedures for special ammunition are described in FM 9-6.

f. Class VI includes personal items sold through the Army and Air Force Exchange Service (PX). Class VI supplies may be available through local procurement, through transfer from theater stocks or through requisition on the Army and Air Froce Exchange Service in CONUS. In cases where no PX service is available, the Ration Supplement Sundries Pack will be issued with class I rations. It consists of a toilet article pack, a confection and a stationery pack.

g. Class VII consists of major end items, such as vehicles and launchers. Class VII items are issued based on daily battle loss reports or formal requisitions submitted through command channels.

h. Class VIII consists of medical material, including medical-peculiar repair parts. These items are requisitioned by the battalion medical section from the appropriate medical supply support units.

i. Class IX supply consists of repair parts and components including kits, assemblies and subassemblies, required for maintenance support of all equipment, except medical materiel.

j. Class X consists of nonstandard items, intended for the support of nonmilitary programs such as agriculture and economic development. Those not included in classes I-IX are requested, obtained, and delivered by the S4.

Conservation of all types of supply must be a matter of emphasis for all leaders. Supplies can be conserved by--

- Recovering, repairing, and salvaging damaged or inoperative equipment.

- Carefully storing supplies to protect them from weather, rodents, etc.

- Safeguarding them from pilferage.

- Insuring economical and efficient use.

- Allowing controlled substitution of parts from vehicles and equipment only as authorized by the commander.

10-4. AMMUNITION OPERATIONS

The resupply of missiles to the firing batteries is one of the most vital combat service support operations performed, since ammunition--the lifeblood of the field artillery--is a primary ingredient of combat power. The S4 has staff responsibility for class V operations, but the

ammunition officer directly controls the resupply effort. The ammunition officer must also be the battalion's expert in the storage, handling, and accountability of all types of class V supplies.

The ammunition platoon of service battery must perform all required inspections to insure reliability of missile rounds prior to delivery to the firing units. Whenever possible, the contact team supporting the battalion should test the missiles with the guided missile test set (GMTS) as part of these reliability checks.

10-5. PERSONNEL AND ADMINISTRATIVE SUPPORT

Those combat service support functions relating to personnel come under the staff supervision of the S1. He supervises and coordinates administrative support of the battalion by processing personnel actions moving from the batteries to the battalion or through the battalion to higher headquarters, and by coordinating with the rest of the staff on such matters as strength, replacements, morale, discipline, law and order, Enemy Prisoners of War (EPW), and medical services. He is assisted in these duties by the members of the personnel administration center (PAC), who also perform routine personnel management functions.

To accomplish his combat administrative support mission, the S1 evaluates SIDPERS input, the personnel daily summary (PDS), daily strength messages, periodic personnel reports, casualty reports and, if appropriate, radiation dosage reports to determine the battalion's replacement needs.

The S1 insures that the battalion receives the proper number and type of replacements through thorough cross-checking of all administrative and operational strength or loss reports and by coordinating assignment priorities with the commander and S3.

The maintenance of discipline, law, and order is a responsibility of the S1. He supervises such matters as control and disposition of stragglers and the administration of military justice.

The S1 is responsible for EPW handling. He fulfills this responsibility by coordinating with the S2.

Collection, identification, safeguarding of personal effects, and evacuation of dead from the battle area are unit responsibilities monitored by the battalion S1.

10-6. MEDICAL SUPPORT

Medical support within the battalion is accomplished primarily by the medical section through evacuation of the sick and wounded from battery areas and provision of rapid emergency medical treatment following evacuation. The section administers the battalion aid station, located as far forward as the tactical situation permits.

Each battery is provided an aidman, who administers routine or emergency medical treatment within his capabilities and insures that those casualties who must be evacuated for further treatment are properly prepared and promptly moved. The battery aidmen essentially perform triage--the sorting of casualties to determine priority of further treatment and who can be returned to duty.

Section III. MAINTENANCE

10-7. MAINTENANCE

Maintenance involves all actions taken to keep material in a serviceable condition or to restore it to serviceability. A successful maintenance program is, therefore, dependent upon the concentrated efforts of all personnel of the Lance battalion. Although the S4 is charged with staff supervision of maintenance, the battalion motor officer has direct supervision of the battalion maintenance effort.

Maintenance management in the battalion is facilitated by a constant analysis of the eight critical factors affecting the maintenance effort.

- Personnel
- Time
- Tools
- Repair parts
- Records
- Publications
- Facilities
- Command emphasis

Continued evaluation of these factors as they affect the battalion's maintenance posture serves to identify problem areas and suggest corrective actions. Viewed in the context of the mission and tactical situation, they also enhance the establishment of priorities required by personnel and time limitations.

FM 29-2, Organizational Maintenance Operations, is a single-source reference for the battalion commander and his staff on the planning, managing, and evaluating of the organizational maintenance program. The principles, procedures, and techniques contained therein should be the basis for the battalion's maintenance operations, and for a concise SOP that defines the maintenance responsibilities of personnel throughout the battalion.

10-8. MAINTENANCE OF LANCE-PECULIAR EQUIPMENT

Lance-peculiar equipment is authorized in only two elements of the battalion--the firing battery and the service battery ammunition platoon. A Lance missile maintenance technician (warrant officer, MOS 214G) is assigned to the battery headquarters of service battery and is responsible for advising the battalion commander on Lance-peculiar

equipment maintenance and providing guidance or assistance to unit personnel performing maintenance on Lance-peculiar equipment.

a. Organizational Maintenance. Organizational maintenance is the maintenance normally authorized for, performed by, and the responsibility of the using organization on equipment in its possession. This maintenance consists of cleaning and repair functions within the capabilities of authorized personnel using skills, tools, and test equipment prescribed in appropriate DA tables of organization and equipment (TOE) or tables of distribution (TD). Maintenance not authorized at this level will be reported to the next higher supporting level of maintenance or service. During tactical operations, the normal practice is to remove a faulty missile from the launcher immediately and replace it with a serviceable one, rather than attempt maintenance at the firing position. Unserviceable missile components can be evacuated to the special ammunition supply point (SASP) or ammunition supply point (ASP) as a defective class V item.

Maintenance performed by operators and crewmen on missiles or missile-peculiar items such as a firing device or monitor-programmer will be supervised by their section chief with the guidance or assistance of the Lance missile maintenance technician. This maintenance will be limited to inspection, cleaning, lubrication, replacement of lamps, minor paint touch-ups, and missile prelaunch checkouts with the monitor-programmer. Operator and crewmen maintenance of common-type items (loader-transporter, launcher, azimuth laying set, sling, and tripod hoist) will be no different from that performed on like hardware items currently in the Army inventory. Maintenance of the nickel-cadmium (NICAD) batteries used to power the monitor-programmer will be limited to charging the battery from the slave receptacle of the Lance basic vehicles.

The battalion maintenance section of service battery will be responsible for that phase of organizational maintenance in support of the battalion's operators and crewmen. Service battery and firing battery maintenance operators and crewmen in their performance of organizational maintenance and scheduled maintenance on the battalion's equipment, will handle organization-level parts replacement, and will perform minor repairs and adjustments.

b. Support Maintenance. Support maintenance consists of all maintenance functions of intermediate direct support (DS) and intermediate general support (GS) organizations. Conventional items of the system will be supported by maintenance equipment common to today's field army. The principal equipment for support of the missile-peculiar items consists of the AN/TSM-84 test set and the land combat support system (LCSS). Maintenance of nickel-cadmium batteries and retention of spare batteries will be functions of the rocket and missile support detachment. All tools and test equipment, for nickel-cadmium battery maintenance will be allocated to the Lance missile contact team attached to the battalion.

(1) Intermediate direct support maintenance. Intermediate direct support maintenance is that degree of maintenance normally not authorized to organizational elements but accomplished in immediate support of those elements. Essentially, direct support responsibilities include limited parts supply; in-storage monitoring; and replacing, repairing, exchanging, and returning to the user, after repair, those items that are beyond the maintenance capability of organizational maintenance personnel. Lance battalions will obtain conventional direct support maintenance from the corps support brigade's light maintenance company. Conventional direct support maintenance for common-type end items will be no different from that performed on like hardware items currently in the Army's inventory.

Lance maintenance contact teams provide on-site checkout and repair or replacement of missile components, missile-peculiar test equipment, and training missiles. These contact teams also provide technical assistance as required by the using units and special ammunition units supporting the Lance missile system. Augmented by class V personnel of the special ammunition companies and using AN/TSM-84 test sets, these teams will perform 6-month in-storage monitoring of all missiles in ammunition supply points and artillery battalions.

(2) Intermediate general support maintenance. Intermediate general support maintenance is the support authorized to, and performed by, a designated support organization with specially trained personnel repairing items of equipment for return to local supply stocks. These repairs are accomplished by replacing assemblies, subassemblies, parts, and modules; fabricating parts from bulk material; and repairing end items, assemblies, and subassemblies, and modules.

The basic unit for general support of Lance-peculiar electronic items is the rocket and missile support detachment. Using the LCSS test set, this detachment will repair all electronic items to the lowest authorized level. This includes replacing subassemblies, modules, cards of the monitor-programmer and the AN/TSM-84 test set, and the subassemblies of the guidance set. The general support missile support detachment team EJ will provide electronic and other missile maintenance support to the area special ammunition general support companies stocking Lance class V material.

The special ammunition general support company has a limited Lance maintenance repair mission of class V items; e.g., replacement of the safe-arm igniter. The main Lance support service for this organization is storage and resupply of missile main assemblages and warhead sections for the SASP and the artillery battalions. Class V items not repairable by this organization will either be evacuated to CONUS depot facilities for renovation or be destroyed under existing regulations. Visual inspection and surveillance of the ammunition stockpile is the assigned function of the company.

Conventional general support maintenance for common-type end items of the system will be provided by the heavy equipment maintenance company of the corps support brigade.

c. Calibration. Calibration services will be performed in accordance with AR 750-25. Rocket and missile support detachment personnel will use the AN/TSM-84 test set to perform level C (maintenance) calibration of the monitor-programmer. Level C (maintenance) calibration of the test set will be performed using the land combat support system. Level A calibration of conventional tools and test equipment (e.g., torque wrenches, multimeters, etc.) will be performed by personnel of the calibration company. The forward mirror bracket (part of the azimuth laying set) will be supported by a secondary reference lab on a turnaround basis. Spare brackets will be provided to the using unit.

10-9. MANAGING COMBAT SERVICE SUPPORT

The success of the Lance battalion's tactical operations is directly related to the quality and timeliness of the support provided by its combat service support elements. Therefore, the management of support functions and operations in the battalion by the S1, S4, or any other supervisor must be closely coordinated with the tactical operations. A continuous exchange of information among combat service support (CSS) managers, the S3, and battery commanders is essential to the success of both tactical and logistical plans.

CHAPTER 11
OPERATIONS IN SPECIAL ENVIRONMENTS

The Lance commander who must operate in special environments should be aware of the problems that can develop because of extreme conditions of terrain and weather. These conditions can combine to degrade weapons system capabilities and impose severe limitations on the personnel operating and maintaining the equipment. While the Lance unit's mission will not change, the employment of the unit must be tailored to the particular environment. Key considerations that must be included in planning and preparation for operations in a special environment are:

What is the enemy threat and what effect will the environment have on enemy tactics and techniques?

How can the basic elements of Lance doctrine be best applied in view of environmental characteristics?

What effect will the environment have on normal maintenance procedures?

What effect will the environment have on normal weapon system employment and functioning?

What effect will the environment have on personnel (special clothing, medical supplies, food, soldier fatigue)? What effect will this have on normal supply requirements? Can acclimatization be conducted prior to operations?

What special combat service support will be required?

The effects of special environments on communications and surveying procedures may greatly influence tactical operations. Since these areas are not within the scope of this manual, refer to FM 6-2, Field Artillery Survey, and FM 24-18, Field Radio Techniques.

11-1. JUNGLE ENVIRONMENT

For a detailed discussion of operations in a jungle environment see FM 90-5. Specific considerations that can enhance Lance operations are:

- Keep electronic equipment such as the monitor-programmers and FDS turned on as much as possible. The self-generated heat of components will hold down excessive moisture, corrosion, and fungus growth.

- Monitor humidity indicators frequently and change dessicant/reject equipment as required.

- Keep all equipment as clean as possible (especially theodolites).

- Do not open sealed warhead and MMA containers until ready to mate.

11-2. DESERT OPERATIONS

For a detailed discussion of operations in a desert environment see FM 90-3. Specific considerations that can enhance Lance operations are:

- Utilize remote theodolite instrument covers during sighting and laying operations.

- Keep controls on all electronic equipment clean.

- Monitor Ni-cad batteries and replace when required.

- Verify gunner sight unit checks and adjustments when sudden temperature changes (±40 degrees) are experienced.

11-3. MOUNTAINOUS ENVIRONMENT

For a detailed discussion of operations in a mountainous environment see FM 90-6. Specific considerations that can enhance Lance operations are:

- Insure proposed firing points do not exceed slope limitations.

- Plan for additional time to perform technical operations in extremely high altitudes.

11-4. NORTHERN REGIONS

For a detailed discussion of operations in northern regions see FM 31-71. Specific consideration that can enhance Lance operations are:

- Verify gunner sight unit checks and adjustments when sudden temperature changes (±40 degrees) are experienced.

- Use the remote theodolite winterization kit.

11-5. OPERATIONS IN BUILT-UP AREAS

For a detailed discussion of operations in built-up areas see FM 90-1. Specific considerations that can enhance Lance operations are:

- Perform assembly and transload operations inside large buildings/warehouses.

- When a battery occupies a village internal firing points should be avoided to preclude compromising the battery location. In this case, displacing from a village would take considerably longer than normal field displacement.

CHAPTER 12
AIR ASSAULT OPERATIONS

Because of the design of the Lance launcher, the firing platoon may fire from almost any place on the battlefield with certain considerations. If the position cannot be reached by ground, the launcher converted to its lightweight configuration (LZL) can be airlifted to whatever firing position desired. On a much larger scale, the force commander or theater commander may desire to move a Lance firing battery or an entire battalion from one battle area to another or to an entirely different continent to influence the tactical or strategic situation to our own advantage. The purpose of this chapter is to discuss these capabilities.

12-1. OPERATIONS

Air assault operations for Lance are defined as operations in which Lance firing platoons with their ancillary equipment move about the battlefield by cargo helicopter under the direction of the force commander to fire upon deep targets that cannot be engaged from normal battery positions. Air assault operations are characterized by detailed planning and coordination, aggressive execution, speed of displacement, and operation with minimum essential personnel and equipment for periods of short duration.

a. Considerations. Advantages of an air displacement must be weighed against ground movement of a firing platoon along with other factors described below prior to undertaking an air assault mission. Factors to be taken into consideration should include:

- The advantages gained through air movement must outweigh the relative vulnerability of troops and equipment to enemy air defense capabilities.

- Availability of aircraft and time delay anticipated prior to the arrival of air support.

- Availability of survey control at the distant firing point. If there is no survey control available, time must be allowed to accomplish hasty survey techniques and establish accurate directional control. This will generally require 45 minutes to 1 hour.

- Number of rounds to be fired. Resupply of the LZL at an air assault location should be accomplished only in a relatively secure area because of time-consuming manual operations and the amount of helicopter groundtime required.

- The amount of time required to perform a conversion. It may take longer to convert the self-propelled launcher to the air transportable lightweight launcher (LZL) and fly to the position than it would to travel by ground.

- Proximity of friendly/enemy troops. Because of Lance's characteristic signature effect on firing, positions of friendly elements in the immediate area may be compromised and exposed to a greater risk of counterfire or attack by air. Operations in the vicinity of enemy activity should be undertaken only if adequate security for the firing element can be provided. A Lance battery cannot provide adequate security for air assault operations and simultaneously maintain rear area operations and security.

b. Application. Corps aircraft assets must perform a variety of missions throughout the corps. Lance air assault operations may be dependent upon availability of these aircraft and should be limited to movement of platoons to achieve greater depth of fires in enemy territory. The following examples demonstrate (but are not necessarily limited to) how Lance may be employed in an air assault configuration:

(1) Covering force operations. If the force commander deems it appropriate, Lance firing elements may be transported up to the planned FLOT or beyond in order to achieve a greater penetration into enemy territory where, for example, massed forces assembled for an offensive operation might be encountered. An operation of this nature should be attempted only if adequate security is available for defense of the platoon or if only very limited contact has been made in the covering force area. A sustained operation for example would not be feasible because of difficulty in ammunition resupply.

(2) To support fast-moving, ground-gaining elements. In vigorous allied offensive operations, rapid advances of friendly ground forces could conceivably move the FLOT far enough forward to necessitate rapid deployment of Lance firepower forward to maintain depth of fires.

(3) To overcome battlefield obstacles. Significant battlefield obstacles may hinder movement of a firing section between firing points and/or the battery position. Air movement of a firing section over obstacles such as radiological or toxic contamination, barriers such as flooding or destroyed bridges/roadways, or areas of intense fighting or enemy troop concentrations would limit personnel and equipment risk and reduce response times.

c. Preparation. In preparation for a Lance air assault operation, the basic planning sequence outlined in FM 57-35 should be considered. This is an inverse planning sequence and is generally accomplished in four phases; planning, loading, movement, and occupation. Planning is materially enhanced by the development and rehearsal of SOPs and by frequent briefings.

d. Execution. The technical aspects of an air assault operation are discussed in TM 55-1115-485-12-1 and TM 55-1425-485-15-1. There are two basic types of air assault operations that can be performed--the air assault fire mission, and air convoy/resupply mission.

(1) Air assault fire mission.

In the first phase of the operation, an advance party moves forward to secure and prepare the firing position. The advance party will generally be under the control of the firing platoon sergeant and consist of an instrument operator, survey personnel, and security personnel. Pathfinder personnel will be required for night operations and may be utilized for daylight missions. Utility-type aircraft may be used to deliver and pick up the advance party and may act as an air retrans so that radio contact can be maintained with the battery. Radiological survey and chemical agent detection equipment should be used on initial occupation of the firing point.

If the firing position has not been previously surveyed, it will be necessary to accomplish hasty survey techniques to establish horizontal control. Directional control can be imparted through use of astronomic techniques or through the use of the survey instrument, azimuth gyro, lightweight (SIAGL). Because of its relatively small size and weight, the SIAGL can be transported in utility helicopters. Approximately 1 hour should be allowed for the preparation of a previously unsurveyed firing point. If the firing point has already been established, less time will be required.

If necessary, conversion from SPL to LZL and/or rigging may be accomplished concurrently with the advanced party's occupation of position. The LZL should not be exposed at the pickup zone (PZ) until just prior to the arrival of the mission aircraft to preclude detection.

Cargo-type helicopters will be used to transport the launcher and crew to the firing position. The launcher can be loaded internally to deceive the enemy. Attack helicopters from the attack helicopter company may provide overwatch or security for the air movement. Aircraft should employ terrain flying techniques along a preselected route to the firing position to avoid detection by enemy observation or air defense radar. If transporting a nuclear round, an alternate load-carrying aircraft with the required guard force will accompany the mission aircraft. Final approach and identification of the firing point may be facilitated through the use of radio vectoring or visual signaling/identification or a combination of both.

Depending on the tactical situation and availability of aircraft, external rigging of the LZL may be desired. In this case the firing platoon and 1/4-ton truck can be loaded on the same aircraft as the LZL. The 1/4-ton truck can be used to provide an alternate power source for the launcher's NICAD battery and can pull the LZL short distances.

Because of the short reaction time of the firing section once at the position, the mission aircraft sets down in a hide position in the vicinity of the point with its engines running during the actual accomplishment of the mission.

If no more rounds are to be fired from that position, extraction is accomplished as rapidly as possible after firing to avoid detection and counterfire.

(2) Air convoy/resupply mission. If more than one round will be fired from an airmobile position, or if a firing platoon/firing battery is isolated from normal resupply trains, it will be necessary to air transport missile rounds, ammunition, equipment, etc., to the detached element. Air convoy operations will generally consist of a scout aircraft to fly reconnaissance and the mission aircraft with winch capability. If nuclear warheads are being transported, an alternate load-carrying aircraft with the required guard force will accompany the mission aircraft. Attack helicopters, if available, should provide overwatch for the convoy. Upon arrival at the destination, the mission aircraft will be unloaded and reloaded with empty containers (where applicable) as rapidly as possible to preclude extended helicopter groundtime.

Note. Rounds and equipment will be loaded and unloaded IAW procedures outlined in the appropriate TMs.

12-2. AIR TRANSPORTABILITY

The lightweight configuration of the Lance launcher allows it to be transported using Army assets across the battlefield to influence the tactical situation. On a higher level, circumstances can arise necessitating the movement of an entire Lance battery or battalion to influence either the tactical or strategic situation to the theater commander's advantage. Movements of Lance units will generally be under the direction of theater commanders-in-chief and will be either intertheater or intratheater operations.

An air movement operation involves the air transport of units, personnel, supplies, and equipment, including airdrops/extractions and air landings, and covers both tactical and administrative movements. A movement by other modes of transportation may precede or follow air movement.

To have a successful joint airlift operation involving two or more services in the movement and delivery of a Lance unit by air into an objective area, the enemy's capability to employ offensive or defensive weapons must be sufficiently reduced to permit the conduct of airlift operations without first incurring unacceptable losses, or the probability of his employing these weapons must be sufficiently low to justify the risk, or the risk must be accepted.

Airlift operations require detailed planning and close coordination among Army and Air Force forces. The feasibility of an operation must be closely weighed with particular emphasis given to the adequacy of total resources to achieve the objectives. Close relationships and coordination between participating units are continued during planning,

briefing, aircraft loading, movment, and the assault phase and until the joint operation is terminated.

Lance units with an airlift contingency may be strategically or tactically deployed (i.e., moved or relocated by air) on short notice, to any land area within the delivery capability of the aircraft force, and employed as a deterrent or combat force. The strategic mobility of Lance units would permit their rapid employment to meet emergencies in a variety of conflict environments anywhere in the world. Lance airlift operations provide a means by which a commander can decisively influence the tactical situation by both long and short range movements. Strategic surprise can be obtained by rapid shifts of Lance units over great distances; tactical surprise is achieved by the sudden, unexpected delivery of these units into an objective area. This would constitute an effective means of providing show of force in furthering national interests, since their presence would furnish an impressive display of US capabilities. Lance units may be transported to an area of operations by large strategic airlift aircraft and reloaded to tactical airlift aircraft for further deployment to the objective area. If air movement is to be fully exploited, careful plans must be made to accomplish rapid in-transit reloading. Under certain conditions, Lance units may be loaded on the tactical airlift aircraft, which will deliver them directly to the objective area. Where transloading is necessary, units should be formed into suitable tactical aircraft increments prior to the initial air movement.

Air movement has several limitations as discussed below.

Elements of an air movement are particularly vulnerable to enemy air defense measures that must be neutralized, suppressed, or avoided. Air superiority en route to and over the objective area is essential for airlift operations.

After delivery, the force is vulnerable to air, armor, nuclear, chemical, and biological agent attacks. Adequate lightweight antitank and air defense weapons, air interdiction, tactical air support, use of chemical/biological/radiological protective measures, and proper selection and utilization of terrain will reduce this vulnerability.

Unfavorable weather, including low visibility, low ceiling, and high winds, may restrict airlift operations. The limitations imposed by bad weather can be offset in varying degrees by appropriate use of electronic navigational and landing aids.

Physiological limitations associated with acclimatizing troops deployed over long distances involving extreme climate and altitude changes may appreciably reduce the initial effectiveness of air insertions. The initial loss of individual efficiency due to change in environment should be considered during the planning stage of airlift operations.

The theater commander being reinforced will be responsible for providing ammunition either from existing theater stocks or through special provisions for resupply using Air Force, Naval, or commercial resources.

Target acquisition may be a limiting factor upon occupation of a new area because capabilities to acquire lucrative deep targets may not be available.

For more comprehensive procedures involving airlift operations, consult FM 55-10, FM 55-12, FM 55-15, TM 55-602, and FM 57-1.

APPENDIX A
TRAINING FOR A FIELD ENVIRONMENT

Section I. GENERAL

A-1. INTRODUCTION

To survive in combat a unit must train to fight and must continue this training throughout all field exercises and maneuvers. Under the Army training philosophy, the authority and responsibility to organize, conduct, evaluate, and supervise training is delegated through the battalion to the battery level. Decentralized training focuses all training effort at or below the battery level, where the job is actually performed. Therefore, it is the battery commander's responsibility to provide specific instructions to subordinate officers and NCOs to assist them in preparing and conducting training. Battery officers and NCOs must constantly provide feedback to the battery commander on the battery's training needs and levels of proficiency. See FM 21-6, How to Prepare and Conduct Military Training, for guidelines on formulating training.

A-2. PERFORMANCE-ORIENTED TRAINING

Performance-oriented training concentrates on those critical tasks that prepare soldiers for combat. Training is structured around performance-oriented training objectives that contain a statement of the task to be performed, the conditions under which the task is performed, and the training standards of acceptable performance. Due to their nature and structure, these objectives facilitate clear and concise thinking about training for combat.

A-3. DEVELOPING THE TRAINING PROGRAM

FM 25-2(T), How to Manage Training in Units, has been written specifically for training managers. It describes a four step process explaining how to develop training programs (see fig A-1). This publication should be used in conjunction with the ARTEP and related manuals to develop the battery training program.

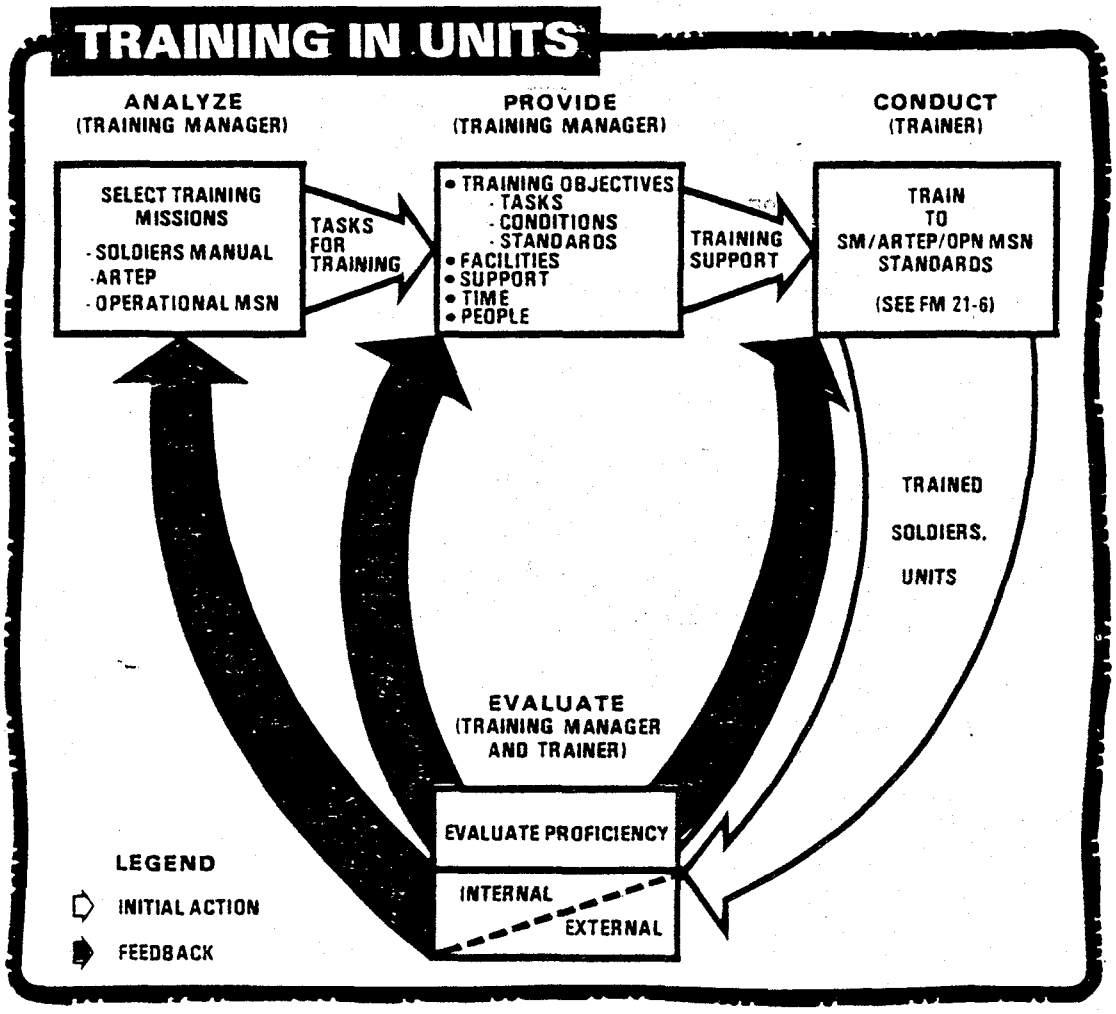


Figure A-1. The four step training process.

a. Training program analysis. In program analysis the battery commander must determine:

(1) The current training level.

(2) The desired training level.

(3) The means to achieve the desired training level.

ARTEP and SQT standards and results can be used to obtain this information.

b. Providing tools for training. Once the battery commander has completed his program analysis, he determines what tools will best fulfill the training needs (see Section II, Chapter A).

c. The conduct phase. The battery commander will then program the training. It will not be possible to select all the performance objectives that were determined in the analysis phase. The battery commander should focus on those objectives that make the greatest contribution to accomplishment of the unit's mission. He must insure that qualified personnel conduct the training.

d. Evaluating training. Performance-oriented training objectives have a built-in evaluation, which shows whether the task has been done to the standards under the given conditions. Thus the battery commander can decide whether his unit has reached his training goals. If not, he starts the training cycle again with input from the evaluation. If so, he orients training toward a new goal while sustaining previous goals.

Section II. TRAINING TOOLS

A-4. GENERAL

Training is a continuous process. At battery level it depends on trial and error to match what the commander wants to do with what the unit has time and resources to accomplish. The object is to build and sustain readiness in the unit to perform its mission.

A-5. TRAINING PUBLICATIONS

The following is a list of those key training publications that form the basis for the battery training program. These publications must be understood and used by all supervisors involved with training or training management.

a. The Army Training and Evaluation Program.

b. The soldier's manuals and commander's manuals for all MOSs in the unit.

c. The operator's manual for each piece of equipment in the unit.

d. The applicable TMs for the Lance system.

e. FM 6-42, The Field Artillery Battalion, LANCE.

f. FM 21-6, How to Prepare and Conduct Military Training.

g. FM 25-2(T), How to Manage Training in Units.

A-6. ARTEP AND FTX

a. The ARTEP (Army Training and Evaluation Program) provides field artillery unit trainers with a list of critical tasks which the unit must perform to standard in order to survive and accomplish its mission on the AirLand battlefield.

b. A combination of both training and evaluation. The ARTEP is a sustained, year-round training program. It also describes the training support requirements, such as devices or items of equipment which will assist in accomplishing performance-oriented training.

c. Successful conduct of a field exercise depends upon a complete scenario based on the ARTEP and good control by battery leaders. Any FTX should be conducted with training to ARTEP standards in mind. The success of the Lance battery in wartime will depend heavily on the proficiency of individual soldiers, crews, and the battery.

d. A well-conducted FTX (field training exercise) provides the battery commander with two well-defined products. First, it demonstrates the ability of the entire unit to perform under simulated combat conditions and identifies training requirements for future training. Second, it offers a test of those skills and techniques taught during previous exercises.

A-7. CREW DRILL

Crew drill is oriented primarily at platoon or section level. Its purpose is to prepare firing platoon and assembly and transport elements to function as a team and accomplish the wartime mission in the most timely, proficient manner with maximum survivability in mind.

a. A crew drill must meet the objectives of section training, which are--

(1) Train individuals in their principal duties.

(2) Train the crew as a team.

(3) Cross train individuals in the various duties within the crew and platoon.

b. It may be used as a mini-FTX or even as a mini-ARTEP to train and evaluate sections in the battery.

c. The crew drill concept allows for intense training or remedial training of smaller than battery-sized elements. This provides the battery commander greater flexibility in the training of his battery. It also involves the platoon leader, platoon sergeant, and section chief to the maximum extent in the training of their subordinates.

A-8. SKILL QUALIFICATION TEST

While the ARTEP is critical to the unit, the soldier's manual (SM) and skill qualification test (SQT) are critical to the individual soldier. A soldier's manual describes what is expected of each soldier at each skill level for that MOS. It contains instructions on how to learn new skills, cites references, and explains the standards that must be met for evaluation (SQT). The soldier cannot be promoted unless he qualifies for award of the next higher skill level. These individual tasks, when taken collectively, form the ARTEP objectives.

A-9. TACTICAL EXERCISE WITHOUT TROOPS

A tactical exercise without troops (TEWT) involves nothing more than a leader taking his subordinates to a predetermined location and discussing application of various tactical principles. During this exercise, the disposition and/or movement of simulated troops or equipment is planned and discussed. Below are some examples of the application of this technique.

a. A TEWT involving the battery commander accompanied by his XO, 1SG, platoon leaders, platoon sergeants, and communications chief. The BC would go with these subordinates to different tentative firing positions. An informal, two-way, question and answer discussion should be conducted to surface problem areas and resolve them prior to conducting a tactical exercise. Topics to discuss include:

(1) positioning of launchers.

(2) organization of the position area.

(3) communications.

(4) entrance/exit routes.

(5) locations of LP/OPs.

(6) employment of crew-served weapons.

The BC need not make meticulous preparation for the TEWT, but he must have a firm idea of the tactical principles of reconnaissance, selection, and occupation of a position.

b. A TEWT may be conducted at the platoon level. In this case, the platoon leader and platoon sergeant go with the section chief and his assistant to a tentative firing position and conduct the same type of actions as discussed in 10-9a. above.

c. This can be a very effective training tool in that it allows the BC/platoon leader to spend a great deal of time with subordinates. Concurrently subordinate leaders are made aware of problems that could be encountered in a position prior to an actual tactical exercise.

d. Preparation must include--

(1) the aim and scope of lessons to be learned.

(2) reconnaissance and selection of the areas to be used to present the activities, discussions and solutions.

(3) preparation of a suggested solution addressing at least the principles involved in the decisions.

A-10. MAPEX

A MAPEX (map exercise) is an exercise for unit leaders. It is conducted in a closed environment, such as a classroom, with a simulated wartime scenario and a map of the area of operation. Individual leaders should be assigned the task of orally presenting a detailed, step by step plan of what will be accomplished for specific portions of the operation. The assignments can go out in advance to permit the leaders to prepare their presentation thoroughly, or the assignments can be given out during conduct of the exercise to develop the leader's ability to think on his feet.

a. May be conducted at battery or battalion level, depending on the desired scope of the exercise.

b. A MAPEX should be conducted prior to an FTX, ARTEP, or other field maneuver and follow the same scenario, i.e., from roll-out/ load-out through final firing operations in the field.

c. Many problems may be solved prior to a unit actually going to the field through the idea exchange at a MAPEX.

A-11. COMEX (Communications Exercise)

Effective training in Lance operations is dependent on effective communications. To provide this communications support, the commo section must be at a satisfactory training level: a COMEX is a means by which this may be sustained. The COMEX is a communications exercise in which the communications elements within the battalion go to the field with the goal of establishing all necessary communications circuits. These COMEXs should be conducted on a frequent basis.

A-12. NBC TRAINING

To survive in a nuclear or chemical environment a soldier must be well trained and given opportunities to put his NBC skills into practice. One way to maintain NBC proficiency is to integrate NBC situations into field problem scenarios. Another way to train and practice NBC skills is to conduct a round-robin set of NBC training stations. These stations should cover those common knowledge soldier tasks found in the soldiers manual for each MOS in the unit. The soldier should be given a "GO" or "NO GO" rating for his performance at

each station with a set standard to be considered NBC proficient (at least 80% "GO" on all tasks by 80% of the unit is recommended to consider the unit NBC proficient). A sample list of stations might include:

a. Don and wear an M17-series protective mask.

b. Perform operator's maintenance on an M17-series protective mask.

c. Identify a chemical agent using the ABC-M8 detection paper.

d. Decontaminate self.

e. Decontaminate individual equipment.

f. Recognize symptoms of a nerve agent and demonstrate related first aid measures.

g. Recognize symptoms of a blood agent and demonstrate related first aid measures.

h. Read and report radiation dosages.

APPENDIX B
ESSENTIAL ELEMENTS OF FRIENDLY INFORMATION (EEFI)

Essential elements of friendly information (EEFI) are knowledge of a weapon system's operation, capabilities and vulnerabilities which, if placed in the wrong hands, could give the Threat a tactical/strategic advantage. EEFI must be protected in peacetime, as well as during periods of hostility, for this reason.

Training of battery personnel in EEFI is the battery commander's responsibility. All personnel are responsible for safeguarding EEFI. Personnel should never discuss unit activities outside their work areas nor to people not in their unit. EEFI should never be discussed over nonsecure means of communication, such as telephones. The following are the EEFI within the Lance system:

a. Ranges of the Lance System.

b. Specific performance characteristics which would indicate weaknesses in the system or methods of exploitation.

c. Classified/FOUO information related to LANCE.

d. Specific details of planned or employed security measures.

e. Specific details of mobile security measures and SOPs for movement or displacement.

f. Specific plans identifying deployment areas or methods of deployment.

g. Technical countersurveillance measures or plans for countermeasures.

h. SOPs for field emplacements and/or design peculiarities causing patterned emplacement in the field.

i. Operating frequencies of radios or secure equipment.

j. Names of key personnel.

k. Extreme personal problems of operators and crewmen.

l. Shortages of personnel.

m. Specific contingency or alert plans.

n. Deployment sequences and times of deployment.

o. Morale problems.

p. Maintenance posture of unit.

q. Equipment shortages.

r. Identification of sensitive equipment or components.

s. Training status.

t. Document identifications (OPORDs, Plans, Contingencies, or any document that would indicate an increased readiness posture).

u. Information regarding communications nets for use in emergencies and/or deployment.

v. LANCE system's vulnerabilities.

w. On mobilization, locations of assembly areas, control points for emergency usage and operations centers.

x. Up-to-date classification guide relating to the LANCE system.

APPENDIX C
INTERNATIONAL STANDARDIZATION AGREEMENTS

C-1. GENERAL

Standardization agreements (STANAGs and QSTAGs) are international agreements designed to facilitate allied operations. Upon ratification by the United States, these standardization agreements are binding upon the United States Forces (entirely or with exceptions as noted).

a. STANAG. A STANAG is the record of an agreement among several or all of the member nations of NATO to adopt like or similar military equipment, ammunition, supplies, and stores and operational, logistic, and administrative procedures. A list of STANAGs in use or under development is published in NATO Allied Administrative Publication (AAP) 4.

b. QSTAG. A QSTAG is an agreement between two or more ABCA countries (United States, United Kingdom, Canada, and Australia) similar in scope to a STANAG. A list of QSTAGs is published in the Quadripartite Standardization Agreement List (QSAL).

c. The following STANAGs/QSTAGs are included in this appendix:

(1) STANAG 2008/QSTAG 503 - Bombing, Shelling, Mortaring and Location Reports.

(2) STANAG 2047/QSTAG 183 - Emergency Alarms of Hazard or Attack (NBC and Air Attack Only).

(3) STANAG 2113/QSTAG 534 - Destruction of Military Technical Equipment.

(4) STANAG 2154/QSTAG 539 - Regulations for Military Motor Vehicle Movement by Road.

C-2. STANAG 2008: BOMBING, SHELLING, MORTARING AND LOCATION REPORTS. (Edition No. 4) NAVY/ARMY/AIR

ANNEX: A. Format for BOMREP, SHELREP, MORTREP or LOCATION REPORT.

Related Documents:
STANAG 2020 - Operational Situation Reports.
STANAG 2103 - Reporting Nuclear Detonations, Radioactive Fallout, and Biological and Chemical Attacks and Predicting Associated Hazards.

AIM

1. The aim of this agreement is to standardize, for the use of the NATO forces, the method of rendering reports on enemy bombing, shelling, mortaring and locations.

AGREEMENT

2. It is agreed that the NATO forces are to use the format shown at Annex A when rendering enemy bombing, shelling, mortaring and location reports. (Additional reporting required when NBC weapons are involved is covered in STANAG 2103.) Nations are free to use their own national forms once the basic information has been received by means of the code letters.

3. It is further agreed that the format is to be completed as detailed in the following paragraphs of this agreement.

CLASSIFICATION OF REPORTS

4. Completed reports are to be classified in accordance with current security regulations.

METHOD OF RENDERING AND TRANSMISSION

5. Reports are rendered as normal messages and are to be transmitted by the fastest means available.

CODE WORDS

6. Each transmission is to be preceded by one of the following code words:

a. SHELREP (in the case of enemy artillery fire).

b. MORTREP (in case of enemy mortar or rocket fire).

c. BOMREP (in the case of enemy air attack).

d. LOCATION REPORT (in the case of location of enemy target). (1)

SECURITY OF MESSAGES

7. The message is always transmitted in clear except as follows:

a. Unit of Origin-Paragraph A of Annex A. The current call sign, address group or equivalent is to be used.

Note (1). To avoid confusion with LOGREP (LOGISTIC REPORT) LOCATION REPORT is written and spoken in full.

b. Position of Observer-Paragraphs B and F.1.b. of Annex A. This is to be encoded if it discloses the location of a headquarters or an important observer post.

c. When the originator considers that the conditions prevailing warrant a higher classification (e.g., paragraph K, if required).

PARAGRAPHS

8. Each paragraph of the report has a letter and a heading. The headings may be included for each reference to facilitate completion, but only the letters are to be transmitted if the report is sent by radio or telephone.

9. Paragraphs which cannot be completed or are not applicable are omitted from the report.

IMPLEMENTATION OF THE AGREEMENT

10. This STANAG will be considered to have been implemented when the necessary orders/instructions to adopt the method described in this Agreement have been issued to the forces concerned.

ANNEX A TO STANAG 2008 (Edition No. 4)
FORMAT FOR BOMBING, SHELLING, MORTARING AND LOCATION REPORTS
(SECURITY CLASSIFICATION)
BOMREP, SHELREP, MORTREP OR LOCATION REPORT
(indicate which)

A. UNIT OF ORIGIN. Use current call sign, address or group or code name.

B. POSITION OF OBSERVER. Grid reference preferred - encode if this discloses the location of a headquarters or important observation posts.

C. DIRECTION (FLASH, SOUND OR GROOVE) AND ANGLE OF FALL/DESCENT. (omit for aircraft.) Grid bearing of flash, sound or groove of shell (state which) in mils, unless otherwise specified. The angle of fall or descent may be determined by placing a stick/rod in the fuze tunnel and measuring in mils, unless otherwise specified, the angle formed by the stick/rod in relation to the horizontal plane.

D. TIME FROM.

E. TIME TO.

F. AREA BOMBED, SHELLED OR MORTARED.

1. Location to be sent as:

a. grid reference (clear reference is to be used)

OR

b. grid bearing to impact points in mils, unless otherwise specified, and distance in meters from observer. This information must be encoded if paragraph B is encoded. (When this method is used, maximum accuracy possible is essential.)

2. Dimensions of the area bombed, shelled or mortared to be given by:

a. the radius (in meters)

OR

b. the length and the width (in meters).

G. NUMBER AND NATURE OF GUNS, MORTARS, ROCKET LAUNCHERS, AIRCRAFT OR OTHER METHODS OF DELIVERY.

H. NATURE OF FIRE. Adjustment, fire for effect, harassing, etc. (May be omitted for aircraft.)

I. NUMBER, TYPE AND CALIBER (State whether measured or assumed.) OF SHELLS, ROCKETS (OR MISSILES), BOMBS, ETC.

J. TIME OF FLASH TO BANG. (Omit for aircraft.)

K. DAMAGE. (Encode if required.)

L. REMARKS.

M. SERIAL NUMBER. (Each location which is produced by a locating unit is given a serial number.)

N. TARGET NUMBER. (If the weapon/activity has previously been given a target number, it will be entered in this column by the locating units.)

O. POSITION OF TARGET (the grid reference and grid bearing and distance of the located weapon/activity.)

P. ACCURACY (the accuracy to which the weapon/activity located. CEP in meters and the means of location if possible).

Q. TIME OF LOCATION (the actual time the location was made).

R. TARGET DESCRIPTION (dimensions if possible):

1. radius of target in meters

OR

2. target length and width in meters.

S. TIME FIRED (against hostile target).

T. FIRED BY.

U. NUMBER OF ROUNDS - TYPE OF FUZE AND PROJECTILES.

C-3. STANAG 2047 (2nd Draft): EMERGENCY ALARMS OF HAZARD OF ATTACK (NBC AND AIR ATTACK ONLY) (Edition No. 5) NAVY/ARMY/AIR

ANNEX: A. Alarm Signals

Related documents:	STANAG 2002 (NBC)-	Marking of Contaminated or Dangerous Land Areas, Complete Equipments, Supplies and Stores.
	STANAG 2103 (NBC)-	Reporting Nuclear Detonation, Radioactive Fallout and Biological and Chemical Attacks and Predicting Associated Hazards.
	STANAG 2104 (NBC)-	Friendly Nuclear Strike Warning to Armed Forces Operating on Land.
	STANAG 2889 (ENGR)-	Marking of Hazardous Areas and Routes Through Them.

AIM

1. The aim of this agreement is to provide a standard method of giving emergency alarms within the NATO forces operating on land, of:

a. Nuclear, biological or chemical (NBC) hazards and strikes.

b. Air attack.

AGREEMENT

2. Participating nations agree that NATO forces, when operating on land, will use the alarm signals detailed herein to give emergency alarms of hazard or attack. Audible and visual alarm signals must be given by means which cannot easily be confused with other sounds or sights encountered in combat. The alarm signals will be given in all cases as soon as an attack or the presence of a hazard is detected. The alarm signals will be repeated throughout the unit area by all who hear or see the original alarm signal since most available alarm signals are generally limited in range. Additionally, audible and visual alarm signals should normally be supplemented by the simultaneous use of radio, telephone and public address systems.

GENERAL

3. It is unlikely that personnel can understand and react quickly and correctly to more than two alarm signals. The two hazards which require fast and correct reaction are NBC (nuclear, biological and chemical) contamination and, secondly, imminent air attack. Therefore, alarm signals for these two hazards are mandatory. (See Note (1).)

Note(1). No reference is made to ground attack in order to reduce to a minimum the numbers of signals. Signals for ground attack, if deemed necessary, remain the prerogative of field commanders.

4. The spoken word (vocal alarm signals) remains the most effective means of informing troops in an emergency.

5. The situation may arise when it is necessary to take account of the presence of more than one of the specific hazards or attacks. Action to be taken will be: For the simultaneous or near simultaneous occurrence of more than one hazard or attack, the alarm signals will first be given for the hazard or attack requiring the fastest preventive action, followed immediately by the signal for the other hazard or attack.

6. Visual alarm signals are included to supplement the audible alarm signals under conditions when audible signals may be lost due to other noises or to replace audible signals when the tactical situation does not permit the use of sound:

a. Reliance should not be placed on visual alarm signals during the hours of darkness or in conditions of poor visibility.

b. Visual alarm signals (color) would be more appropriate to fixed installations (as a supplementary method of warning) than to mobile land forces as the existing profusion of colored tactical signs, pennants, etc., already employed by mobile land forces may lead to misinterpretation.

c. Visual signals should be used to warn those personnel arriving at a particular location of an imminent hazard.

d. Apart from the audio-visual signals detailed at para 2 of Annex A, normal signal flares are excluded from use as a color alarm signal for NBC and Air Attack.

7. The actual form of a visual alarm signal (for colors, see Annex A.) and the method of its display is left to the discretion of the local commander. However, visual alarm signals should clearly differentiate between the major types of threat and should be as simple as possible in order that all personnel may readily understand the alarm signals.

ALARM SIGNALS

8. Alarm signals for use by NATO forces operating on land are in Annex A. There are some differences between the alarm signals prescribed herein and some national civil defense alarm signals. These differences are considered minor and will exist until the nations standardize on civil defense alarm signals.

9. Until such time as agreement is reached on civil alarm signals, NATO forces will ascertain what audible alarm signals are prohibited by the nation in whose territory they are operating before employing audible alarm signals prescribed in this agreement.

PRACTICE ALARM SIGNALS

10. In some cases nations or local regulations preclude sounding alarm signals during exercises. In such cases local commanders should negotiate with local authorities to obtain authorization to sound alarm signals periodically. In the absence of agreement, small alarm devices emitting sound similar to the prescribed audible alarm signals and having limited range should be used during exercises to keep personnel familiar with the audible alarm signals.

IMPLEMENTATION OF THE AGREEMENT

11. This STANAG will be considered to have been implemented when the necessary orders/instructions have been issued directing the forces concerned to put the content of this agreement into effect.

ANNEX A TO STANAG 2047 (2nd Draft) (Edition No. 5)
ALARM SIGNALS

The following are alarm signals for NATO Forces operating on land:

TYPE OF HAZARD OR ATTACK	VISUAL ALARM SIGNAL (Normal Flares Excluded) (To be in accordance with national instructions)	AUDIBLE ALARM SIGNAL
1. Imminent air attack	Red	a. Succession of long warbling signals, such as: (1) Unbroken warbling siren sound for one minute. (2) Succession of long (1) blasts on whistles, bugles or other wind instruments. (3) Series of continuous long (1) blasts on vehicle horn. (4) Vocal:"Air Attack" or corresponding national term where only one nation is involved.
2. Warning of imminent NBC hazards	Yellow or special audio-visual signal, Donning respirator, and taking protective action followed by such hand signals as may be pre scribed in local instructions.	Succession of short signals, such as: a. Rapid and continuous beating on any metal object or any other object which produces a loud nose. b. Succession of short (1) blasts on vehicle horn or other suitable device. c. Interrupted warbling sound on a siren.

3. The "all clear" or release from an alarm signal may be disseminated as follows:

All clear	No standard signal	a. Normally vocal: "ALL CLEAR" by voice, radio, telephone or public address system. b. A sustained signal, such as: (1) Steady siren sound for one minute. (2) Sustained blast on a vehicle horn, whistle, bugle or other wind instrument.

Notes.

1. For the purpose of this STANAG:

   a. Long blast denotes 3 seconds on, 1 second pause.

   b. Short blast denotes 1 second on, 1 second pause.

2. Produced from a single pyrotechnic device: a whistle sound followed by a closely coupled sequence of white, red, white lights.

Note. Automatic alarms for the early and rapid detection of biological and chemical agents, and radioactive fallout should, as far as possible, complement the devices referred to previously.

C-4. STANAG 2113: DESTRUCTION OF MILITARY TECHNICAL EQUIPMENT (Edition No. 3) NAVY/ARMY/AIR

ANNEX: A. Priorities for Destruction of Parts of Military Technical Equipment.

AIM

1. The aim of this agreement is to standardize procedures governing destruction of military technical equipment by the NATO Forces.

AGREEMENT

2. Participating nations agree:

a. That it is essential to destroy, to the maximum degree possible, military technical equipment abandoned on land or in harbor during wartime operations, to prevent its eventual repair and use by the enemy.

b. To follow the principles and priorities set forth in this agreement for the destruction of their own equipment when required.

GENERAL

3. Detailed Methods. Detailed methods of destroying individual items of equipment are to be included in the applicable publications, user handbooks and drill manuals.

4. Means of Destruction. Nations are to provide the means of destroying their own equipment.

5. Degree of Damage.

a. General. Methods of destruction should achieve such damage to equipment and essential spare parts that it would not be possible to restore the equipment to a usable condition in the combat zone either by repair or by cannibalization.

b. Classified Equipment. Classified equipment must be destroyed to such a degree as to prevent the enemy from duplicating it or learning its method of operation.

c. Associated Classified Documents. Any classified documents, notes, instructions, or other written material concerning the operation, maintenance, or use of the equipment, including drawings or parts lists, are to be destroyed in a manner which will render them useless to the enemy.

PRIORITIES AND METHODS OF DESTRUCTION

6. General.

a. Priority must always be given to the destruction of classified equipment and associated documents.

b. When lack of time or means prevents complete destruction of equipment, priority should be given to the destruction of essential parts, and the same parts are to be destroyed on all similar equipment.

c. A guide to priorities for the destruction of parts for various groups of equipment is contained in Annex A to this STANAG.

7. Equipment Installed in Vehicles. Equipment installed in vehicles should be destroyed in accordance with the priorities for the equipment itself, taking into account the relative importance of the installed equipment and the vehicle itself.

8. Spare Parts. The same priority for destruction of component parts of a major item must be given to the destruction of similar components in spare parts storage areas.

9. Cryptographic Equipment and Material. The detailed procedure for the rapid and effective destruction of all types of cryptographic equipment and material is to be specified in the instructions issued by the appropriate authority for security of communications.

10. Authorization. The authority for ordering the destruction of equipment is to be vested in divisional and higher commanders, who may delegate it to subordinate commanders when necessary. Standing orders should cover the destruction of isolated equipments which have to be abandoned on the battlefield.

11. Reporting. The reporting of the destruction of equipment is to be done through command channels.

IMPLEMENTATION OF THE AGREEMENT

12. This STANAG is considered to be implemented when the principles and priorities indicated herein have been incorporated in appropriate national documents.

ANNEX A TO STANAG 2113 (Edition No. 3)
DESTRUCTION OF MILITARY EQUIPMENT
PRIORITIES FOR DESTRUCTION OF PARTS OF MILITARY
TECHNICAL EQUIPMENT

EQUIPMENT	PRIORITY	PARTS
1. VEHICLES (INCLUDING TANKS AND ENGINEER EQUIPMENT)	1	Carburetor or/fuel pump/injector distributor/fuel tanks/fuel lines.
	2	Engine block and cooling system.
	3	Tires/tracks and suspensions.
	4.	Mechanical or hydraulic systems (where applicable).
	5.	Differentials/transfer cases.
	6.	Frame.
2. GUNS	1.	Breech, breech mechanism and spares.
	2.	Recoil mechanism.
	3.	Tube.
	4.	Sighting and fire control equipment (Priority 1 for Anti-Aircraft guns).
	5.	Carriage and tires.
3. SMALL ARMS	1.	Breech mechanism.
	2.	Barrel.
	3.	Sighting equipment (including Infra-Red).
	4.	Mounts.
4. OPTICAL EQUIPMENT	1.	Optical parts.
	2.	Mechanical components.

5. RADIO	1.	Transmitter (oscillators and frequency generators) and IFF equipment.
	2.	Receiver including IFF equipment.
	3.	Remote control units or switchboard (exchanges) and operating terminals.
	4.	Power supply and/or generator set.
	5.	Antennas.
	6.	Tuning heads.
6. RADAR AND OTHER ELECTRONIC EQUIPMENT	1.	Frequency determining components, records, operating instructions, which are subject to security regulations, and identification material (Identification Friend or Foe (IFF)).
	2.	Antennas and associated components such as radiators, reflectors and optics.
	3	Transmission lines and waveguides.
	4	Transmitter high voltage components.
	5	Control consoles, displays, plotting boards.
	6	Cable systems.
	7	Automatic devices.
	8	Other control panels and generators.
	9	Carriage and tires.

7. GUIDED MISSILE SYSTEMS	1	Battery fire control centers.
	2	Missile guidance equipment (including homing systems).
	3	Launchers including control circuits.
	4	Missiles.
	5	Measuring and test equipment.
	6	Generators and cable systems.
8. AIRCRAFT AND SURVEILLANCE DRONES	1	Identification (IFF) equipment, other classified and electronic equipment, publications and documents pertaining thereto, and other material as defined by the national government concerned.
	2	Installed armament (Use subpriorities for Group 2, Guns; or Group 3, Small Arms, as appropriate).
	3	Engine Assembly (Priorities for destruction of magnetos, carburetors, compressors, turbines and other engine subassemblies to be determined by national governments, depending on type of aircraft involved and time available for destruction).
	4	Airframe/control surface/under-carriage (Priorities for destruction of propellers, hub-rotor blades, gear boxes, drive shafts, transmissions, and other subassemblies (not already destroyed in Priority 3) to be determined by national governments, depending on type of aircraft involved and time available for destruction).
	5	Instruments, radios, and electronic equipment (not included in Priority 1).
	6	Electrical, fuel and hydraulic systems.

9. ROCKETS	1	Launcher.
	2	Rocket.
	3	Sights and fire control equipment.

C-5. STANAG 2154/QSTAG 539: REGULATIONS FOR MILITARY MOTOR VEHICLE MOVEMENTS BY ROAD (Edition No. 4) NAVY/ARMY/AIR

ANNEXES: A. Definitions

B. Special Movement

RELATED DOCUMENTS:	STANAG 1059-	National Distinguishing Letters for Use by NATO Armed Forces.
	STANAG 2021-	Computation of Bridge, Raft and Vehicle Classification.
	STANAG 2024-	Military Vehicle Lighting.
	STANAG 2025-	Basic Military Road Traffic Regulations.
	STANAG 2041-	Operation Orders, Tables and Graphs for Road Movement.
	STANAG 2155-	Road Movement Documents.
	STANAG 2159-	Identification of Movement Control and Traffic Control Personnel and Agencies.
	STANAG 2174-	Military Routes and Route/Road Networks.

AIM

1. The aim of this agreement is to set out the basic regulations applying to military motor movement by road for the use of the NATO Forces.

AGREEMENT

2. Participating nations agree to use the regulations applying to military motor movement by road, defined in the following paragraphs, except where they are contrary to national laws and/or regulations.

GENERAL

3. It is particularly important that movement and transport staffs, who are responsible for international road movements and transport are trained to understand and use the terms and definitions listed in Annex A.

COLUMNS

4. A column is a group of vehicles moving under a single commander, over the same route, in the same direction.

5. A large column may be composed of a number of organized elements (formations, units or subunits).

6. Each column and organized element of the column should include:

a. A commander whose location may vary.

b. In the first vehicle: a subordinate commander known as the pace setter (AAP-6).

c. In the last vehicle: a subordinate commander known as the trail officer (see Annex A).

7. The pace setter of the first element of a column leads it and regulates its speed. The trail officer of the last element deals with such problems as occur at the tail of the column.

8. In addition, each vehicle is to have a vehicle commander (AAP-6) (who may be the driver) who is to be the leader of the vehicle crew appointed for each mission. He is responsible for crew discipline and the execution of the mission.

IDENTIFICATION OF COLUMNS

9. Each column is to be identified in accordance with the laws or regulations of the country within which movement is taking place by flags and/or lights and, in some cases, by a movement number (see Annex A).

10. Each column which has received a movement credit (AAP-6) (see para 14 below) is to be identified by a number known as "the movement number" which is allocated by "the authority authorizing/arranging the movement." (See STANAG 2174.) This number identifies the column during the whole of the movement.

11. The movement number is to be placed on both sides and, if possible, on the front of at least the first vehicle and the last vehicle of each organized element of the column. It is to be permanently legible, from ground level, at a minimum distance of 6 meters in normal daylight and composed of:

a. Two figures indicating the day of the month on which the movement is due to commence.

b. Three or more letters indicating the authority organizing the movement, the first two letters being the national symbols of the column. (See STANAG 1059.)

c. Two figures indicating the serial number (AAP-6) of the movement.

d. One letter to identify the element of the column. (This is optional.) Example: Identification of 03-BEA-08-C will indicate that this is the 3rd of the month, moved by BE authority 'A', as column No. 8, element "C".

12. Additionally, each organized element of a column is to be identified by flags and/or for night movement, by lights, security permitting, as described below:

a. The first vehicle of each element of the column is to display a blue flag and a blue light at night if required by national laws or regulations of the country in which the vehicles are operating.

b. The last vehicle of each element of the column is to display a green flag and a green light at night, if required by national laws or regulations of the country in which the vehicles are operating.

c. The vehicle of the column commander is to display a white and black flag as indicated below, subject to the commander's discretion, in certain circumstances.

d. A vehicle that cannot maintain its position in a column should indicate this condition by displaying a yellow flag.

e. Flags should be approximately 30cm (12 in) x 45 cm (18 in) in size.

f. Flags and lights are to be mounted on the front side of the vehicles.

13. Headlights. In peacetime, all vehicles driving in a column are to use dipped headlights (low beam), even in daylight.

MOVEMENT CREDIT

14. A Movement Credit is the allocation granted by the authority (See paragraph 10 above.) to one or more vehicles in order to move over a controlled route in a fixed time according to movement instructions (See STANAG 2174.), a controlled route being a route the use of which is subject to traffic or movement restrictions (AAP-6).

15. The Movement Credit includes the indication of times at which the first and the last vehicle of the column are scheduled to pass:

a. The Entry Point. (See Annex A.)

b. The Exit Point. (See Annex A.)

c. Critical Points (See Annex A.) and, if possible, at Traffic Control Posts.

SPECIAL REGULATIONS FOR THE EXECUTION OF MOVEMENT

16. All personnel exercising a command in the column and all drivers must obey the instructions of traffic control and regulating personnel.

17. When approaching a traffic control or a regulating post indicated by prescribed signs (See STANAG 2025.) the column commander or his representative must advance ahead of his column and report to the post commander to:

a. Give the required information concerning formation/unit, route and destination.

b. Receive information and possible instructions.

18. Through this post, he can also arrange for the transmission of his own instructions, or information, to the various elements of his column as they pass the post, where however, they must not stop unless ordered to do so.

HALTS

19. Short Halts:

a. Short halts made by columns or elements of columns on controlled routes normally are to last 10 minutes and in principle should be taken after every 1 hour and 50 minutes running. Wherever possible all columns following the same route should stop at the same time but movement planning must, where necessary, allow at least a 10 minute column gap or gap between columns to insure that a following column does not overtake the one in front while it is halted.

b. However, the characteristics of the road may make it necessary for the halt to take place in one particular part of the route rather than simultaneously at a fixed time. In such cases, the necessary instructions are given in the orders relating to the movement.

20. Long Halts. No standard rules for the observance of long halts are laid down. They must always be specifically plotted on movement graphs in order to avoid possible conflict.

21. Particular attention is to be paid to the following aspects of traffic discipline during halts:

a. When making a halt, isolated vehicles or vehicles forming part of a column, should move off the roads as much as possible.

b. If this practice cannot be observed, the commander of a column which is halted must take all necessary measures to facilitate movement of other road users and avoid accidents or traffic jams. The measures to be taken will vary according to the conditions and width of the road and should include:

(1) Warning at a sufficient distance from the front and rear of the column (guards, warning flags, lights or flares), security permitting.

(2) Organizing and directing a system of one-way traffic along the column.

c. When a halted column resumes movement, it has the right of way while moving back on to the road, unless otherwise prescribed.

OVERTAKING OF COLUMNS

22. By Isolated Vehicles.

a. An isolated vehicle is authorized to overtake a moving column only when:

(1) Its maximum authorized speed is appreciably higher than the speed at which the column is moving, thus enabling it to overtake each vehicle rapidly.

(2) There is sufficient distance between the vehicles of the column to allow the overtaking vehicle to regain its position in the proper lane after overtaking each vehicle.

(3) The trail officer of the column gives a clear signal that overtaking is possible.

b. In all other cases, an isolated vehicle is to overtake the column only when the latter is halted.

23. By Other Columns:

a. On a controlled route a column may overtake another column only on the orders of the movements authorities and as arranged by the traffic regulating personnel.

b. On an open route no column may overtake another moving column, except in special cases, e.g., on a one-way road which is wide enough. In these cases, the commander of the column desiring to pass is to contact the commander of the column to be passed prior to attempting to pass.

c. Outside these special cases, the overtaking of a column by another column is authorized only if the former is halted and provided the moving column has the time to overtake the whole of the halted column before the latter is ready to move. In this case, the commander of the column desiring to pass is to contact the commander of the column to be passed prior to attempting to pass. The commander of the halted column after giving his agreement, must facilitate the overtaking.

MOVING BY NIGHT

24. Normal conditions. By night, road movement is to be carried out in accordance with national laws and regulations of the country in which the vehicles are operating.

25. Emergency Conditions. See STANAG 2024.

ROAD MOVEMENT OF MOTOR VEHICLES/EQUIPMENT

26. The movement by road of certain outsize or heavy vehicles/equipment is restricted by limitations imposed by the different nations. These will call for the application of special procedures and, where necessary, specialized methods, to effect the movement of such equipment and vehicles whether loaded or not.

27. Annex B outlines, with regard to each nation, the class and gage limits beyond which a road movement becomes a special movement.

IMPLEMENTATION OF THE AGREEMENT

28. This STANAG will be considered to have been implemented when the necessary orders/instructions to use the definitions and regulations contained in this agreement have been issued to the forces concerned.

ANNEX A TO STANAG 2154 (Edition No. 4)
REGULATIONS FOR MILITARY MOTOR VEHICLE MOVEMENT BY ROAD
DEFINITIONS

1. Definitions already included in AAP-6:

a. Those concerning Time and Distance Factors in motor columns:

-Column Gap. -Road Clearance Time. -Traffic Flow.

-Traffic Density. -Road Space.

-Pass Time. -Average Speed.

b. Those concerning Formation and Dispersal of columns:

-Start Point.

-Release Point.

2. Definitions used for the purpose of this Agreement only:

-Blackout Lighting. A condition in which lights are so used that they cannot be spotted by enemy observation but which prevent collisions by showing the position of the vehicle to other road users.

-Column Length. "Column Length" or "Length of a Column" is the length of roadway occupied by a column in movement including the gaps within the column from the front of the leading vehicle to the rear of the last vehicle.

-Column. A group of vehicles moving under a single commander, over the same route, in the same direction.

-Critical Point. That point on a route where any restriction of traffic flow could cause disruption.

-Road Movement Graph. Used by the staffs in planning, supervising and regulating complicated road movements and for providing a convenient means of recording actual moves of units over a period.

-Movement Number. The numeric identification of a movement credit.

-Normal Lighting. Normal lighting is as prescribed or authorized by law of a given country without restrictions for military reasons.

-Open Route. Routes not subject to traffic or movement control restrictions.

-Reduced Lighting (Vehicles). Reduced lighting implies that the brightness of all vehicle lights should be reduced by either reduction in power or by screening in such a way that any visible light is limited in output.

-Special Movement. The movement of outsize or heavy vehicles/equipment which is limited by legal restrictions of class or gage of the host nation.

-Traffic Post. The post from which traffic control is operated.

-Trail Officer. A subordinate commander in each column of vehicles and each organized element of that column who deals with such movement problems that occur at the tail of the column/element of that column.

-Vehicle Distance. The space between two consecutive vehicles of a column measured from the front of one vehicle to the front of the vehicle following. Vehicle distance has a relation to density.

-Entry Point. The point where a column enters a controlled route.

-Exit Point. The point where a column leaves a controlled route.

ANNEX B TO STANAG 2154 (Edition No. 4)
REGULATIONS FOR MILITARY MOTOR VEHICLE MOVEMENT BY ROAD
SPECIAL MOVEMENT

INTRODUCTION

1. The expression "Special Movement" means movement of vehicle/equipment with or without load which, because of their class and/or dimensions, require special routing arrangements.

LIMITATIONS AFFECTING ROAD MOVEMENT

2. The conditions for the road movement of military equipment and vehicles are governed by the capabilities of existing road networks as defined in STANAG 2174. Further, the special regulations in force in the different countries place certain limitations on ordinary road movement of:

a. Individual wheeled or tracked vehicles, whether loaded or not.

b. Articulated vehicles consisting of a prime mover and semi-trailer.

c. Articulated trains of vehicles consisting of a tractor and one or more trailers.

d. Passenger transport vehicles (motor coaches).

3. These limitations relate to some or all of the following characteristics of the:

a. Width measured on any cross-section, including all projections.

b. Length (of vehicle or train of vehicles), including all projections and, where applicable, length of each part of the train: tractor + trailer(s).

c. Total height of the vehicle, including load, if any.

d. Turning radius.

e. Class of vehicle (or train of vehicles), calculated according to the method laid down in STANAG 2021.

RULES GOVERNING SPECIAL MOVEMENT

4. Any road movement of military equipment and vehicles of which one or more of the characteristics listed in paragraph 3 above exceeds the corresponding limitation(s) imposed by the regulations in force in any of the countries in which it will have to move constitutes a "special movement" in the country concerned.

APPENDIX D
REFERENCES

Department of the Army Pamphlets of the 310 series should be consulted frequently for latest changes or revisions of references given and for new material on subjects covered in this manual.

D-1. ARMY REGULATIONS (AR)

50-5	Nuclear Surety
50-109	Safety Rules for the Operation With the Lance Nuclear Weapon System
350-1	Army Training
350-212	Military Justice
350-216	The Geneva Conventions of 1949 and Hague Convention No. IV of 1907
350-225	Survival, Evasion, Resistance, and Escape (SERE) Training
(C) 380-40	Policy for Safeguarding and Controlling COMSEC Information (U)
385-10	Army Safety Program
385-62	Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice, and Combat
530-1	Operations Security
530-2	Communications Security
700-9	Policies of the Army Logistics System
710-2	Supply Policy Below the Wholesale Level
750-25	Army Meteorology and Calibration System

D-2. FIELD MANUALS (FM)

3-12	Operational Aspects of Radiological Defense
5-20	Camouflage
5-100	Engineer Combat Operations
6-2	Field Artillery Survey

	6-15D 1/2	Soldier's Manual: 15D, Lance Missile Crewmember/ MLRS Sergeant, (Skill Levels 1 and 2)
	6-15D 3/4	Soldier's Manual: 15D, Lance Missile Crewmember/ MLRS Sergeant, (Skill Level 3 and 4)
	6-15D TG	Trainer's Guide, 15D, Lance Missile Crewmember/ MLRS Sergeant
	6-15J 1/2	Soldier's Manual, 15J, Lance Operations/Fire Direction Specialist (Skill Levels 1 and 2)
	6-15J 3/4	Soldier's Manual, 15J, Lance Operations/Fire Direction Specialist (Skill Level 3 and 4)
	6-15J 4	
	6-15J TG	Trainer's Guide, 15J, Lance Operations/Fire Direction Specialist
	6-20	Fire Support in Combined Arms Operations
	6-20-1	The Field Artillery Cannon Battalion
	6-20-2	Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps)
	6-40-4	Field Artillery Lance Missile Gunnery
(C)	6-42-1	The Field Artillery Battalion, Lance (U)
	6-50	The Field Artillery Cannon Battery
	6-141-1	Field Artillery Target Analysis and Weapons Employment: Nonnuclear
(C)	6-141-2	Field Artillery Target Analysis and Weapons Employmment: Nonnuclear (U)
	8-35	Evacuation of the Sick and Wounded
	9-6	Ammunition Service in the Theater of Operations
	11-50	Combat Communications Within the Division
	11-92	Combat Communications Within the Corps
	19-25	Military Police Traffic Operations
	19-30	Physical Security
	20-32	Mine/Countermine Operations at Company Level
	21-6	How to Prepare and Conduct Military Training

	21-10	Field Hygiene and Sanitation
	21-26	Map Reading
	21-30	Military Symbols
	21-40	NBC (Nuclear, Biological and Chemical) Defense
	21-60	Visual Signals
	24-1	Combat Communications
	24-18	Field Radio Techniques
	24-20	Field Wire and Field Cable Techniques
	25-2(T)	How to Manage Training in Units
	29-2	Organizational Maintenance Operations
	30-5	Combat Intelligence
	30-102	Opposing Forces: Europe
	31-71	Northern Operations
	32-6	SIGSEC Techniques
(C)	32-9	ELSEC Techniques
	44-1	US Army Air Defense Artillery Employment
	44-23	US Army Air Defense Artillery Employment, Redeye
	44-23-1	Operations and Training, Redeye
	54-2	The Division Support Command and Separate Brigade Support Battalion
	54-9	Corps Support Command
	54-10	Logistics: An Overview of the Total System
	55-10	Army Movement Management Units and Procedures
	55-12	Movement of Army Units in Air Force Aircraft
	55-15	Transportation Reference Data
	55-30	Army Motor Transport Units and Operations

	57-1	US Army/US Air Force Doctrine for Airborne Operations
	90-2	Tactical Deception
	90-3	Desert Operations
	90-4	Airmobile Operations
	90-5	Jungle Operations
	90-6	Mountain Operations
	90-10	Military Operations on Urbanized Terrain (MOUT)
	90-13	River Crossing Operations
	100-5	Operations
	100-10	Combat Service Support
	100-50	Operations for Nuclear-Capable Units
	101-10-1	Staff Officer's Field Manual: Organizational, Technical, and Logistical Data, Unclassified Data
(S)	101-31-2	Staff Officers' Field Manual: Nuclear Weapons Employment Effects Data (U)
(C)	101-60-18	Effectiveness Data for Nonnuclear Lance (U)
	704-28	Classes of Supply

D-3. TECHNICAL MANUALS (TM)

	9-1115-485-12	Nuclear Warhead Section M234 (Tactical) and M240 (Training)
	9-1115-485-12-1	Operators and Organizational Maintenance (Supplement) for M234 Atomic Warhead Section and M240 Training Atomic Warhead Section
	9-1336-489-12&P	Nonnuclear Lance Warhead Section M251 (Tactical) and M201 (Training)
	9-1410-485-12	Operator and Organizational Maintenance Manual M-5 MMA Ammunition
	9-1425-485-L	List of Applicable Publications (LOAP) for Lance Guided Missile System

	9-1425-485-10-1	System Description for Lance Guided Missile System
	9-1425-485-10-2	Operator's Manual for Lance Firing Operations
	9-1425-485-12	Operator and Organizational Maintenance Manual Lance Launch Area Equipment
	9-1430-489-12	Operator and Organizational Maintenance Manual Azimuth Laying Set
	9-1450-485-10	Operators Manual: Carrier, Guided Missile Equipment M667
	9-1450-486-12	Operators and Organizational Maintenance Manual Lance Hand Equipment for Loader, Transporter, M688: Mobility Kit, M234: Tripod Hoist, M38; Sling Beam, M22
	38-750	The Army Maintenance Management System
(C)	39-50-8	Emergency Destruct of Nuclear Weapons (U)
	39-0-1A	Numerical Index to Joint Nuclear Weapons Publication
	55-1425-485-15-1	Transportability Guidance: Lance Missile System (All Modes) and Air Transport Procedures for Lance Nuclear Warhead Section by US Army Helicopters

D-4. MISCELLANEOUS PUBLICATIONS

	ARTEP 6-595	Lance, the Field Artillery Battalion
	TOE 6-595H4	Field Artillery Battalion, Lance
(C)	FTR LANCE A-1	Firing Table for Warhead Section Atomic M234 and Warhead Section, GM, Practice: Lightweight, M252 (U)
(C)	FTR LANCE B-1	Firing Table for Warhead Section, GM, HE: M251, and WHS, Practice: M198 (U)
(C)	FTR LANCE-ADD-A-1	Firing Table Addendum to FTR LANCE B-1 for Warhead Section, GM, HE: M251 (U)